1998-2005 ACCESSORIES & BODY, CAB

Electrical System - Body - 163 Chassis

GENERAL INFORMATION

GENERAL NOTES: PASSENGER CARS: ELECTRICAL SYSTEM BODY - AH82.00-Z-9999AZ

MODEL all

	Adjusting headlamps when driving abroad	MODEL 452.3 /4	AH82.10-P-0001-01RR
	Adjusting headlamps when driving abroad	MODEL 450.3 up to 10.2.02	AH82.10-P-0001-01SM
	Adjusting headlamps when driving abroad	MODEL 450.3 as of 11.2.02, 450.4 (except 450.418)	AH82.10-P-0001-01SN
	Notes on wiper arm adjustment	MODEL 164, 251	AH82.30-P-0001-01GZ
	Notes on radio installation	MODEL 169,245...	AH82.60-P-0001-03AK
	Notes on D2B ring	MODEL 215.###, 220.###1# as of 1.9.02 with CODE (803) Model year 2003	AH82.70-P-0001-03MN
	Notes regarding the Tele-Aid emergency call system	MODEL 215, 220 with CODE (347) TELE AID emergency call system (D2B) with CODE (855) TELE AID	AH82.95-P-0001-01AM
i	Adjusting headlamps when driving abroad	MODEL 199	AH82.10-P-0001-01SLR
i	Notes on navigation system TrafficStar	MODEL 129, 140, 163, 168, 170, 202, 208, 210	**AH82.61-P-0001-03A**
i	Notes on telephone operation with Audio 30 APS navigation system	MODEL 129, 163, 168, 170, 202, 208, 210 ...	**AH82.61-P-0001-06A**
i	Notes on Traffic Pro navigation system	MODEL 129, 140, 163, 168, 170, 202, 208, 210	**AH82.61-P-0002-01A**
i	Notes on D2B ring	MODEL 129...	AH82.70-P-0001-03D
i	Notes on Linguatronic voice control system	MODEL 220 ...	AH82.70-P-0001-06CM
i	Notes on converting portable cellular telephone installation kit	MODEL 129, 168, 170, 202, 208, 210, 215, 220...	AH82.70-P-0001-08A
i	Information on Tele Aid	MODEL 140.###1#, 210	AH82.95-P-0001-01A

	emergency call system	with CODE (348) TELE AID emergency call system	
i	Notes regarding the taxi emergency call system	MODEL 140,202,210,220...	AH82.95-P-0002-01A
i	Adjusting headlamps when driving abroad	MODEL 164, 169, 171, 203, 209, 211, 215, 216, 219, 220, 221, 230, 245, 251 ...	AH82.10-P-0001-01A
i	Adjust headlamps when driving abroad	MODEL 454.0	AH82.10-P-0001-01FF
i	Adjusting headlamps when driving abroad	MODEL 451.3/4	AH82.10-P-0001-01MCC
i	Retrofitting xenon headlamps	MODEL 129, 140, 202, 210, 220 ...	AH82.10-P-1003-01A
i	Retrofitting xenon headlamps	MODEL 210.###1# as of 1.7.99	AH82.10-P-1003-01F
i	Notes on retrofitting xenon headlamps	MODEL 203	AH82.10-P-1003-01P
i	Notes on installing taxi/rental vehicle equipment	MODEL 245 ...	AH82.25-P-0001-01BK
i	Notes on installing rental vehicle equipment	MODEL 221.0##/1##1# except CODE (498) Japan version except CODE (494) USA version	AH82.25-P-0001-02SX
i	Notes on mirror taximeter	MODEL 202, 203.0, 210, 220 with CODE (450) Taxi version	AH82.25-P-1000-02P
i	Notes on wiper arm adjustment	MODEL 171.4, 203, 209, 211, 215, 220, 230, 240	AH82.30-P-0001-01A
i	Notes on wiper arm adjustment	MODEL 129,202,208,210	AH82.30-P-0001-01B
i	Notes on wiper arm adjustment	MODEL 219.3	AH82.30-P-0001-01TX
i	Notes on COMAND software status	MODEL 215, 220 with CODE (352a) COMAND operating and display system bei APS der 3. Gerategeneration	AH82.60-P-0001-01A
i	Notes on radio installation	MODEL 203 ...	AH82.60-P-0001-03P
i	Notes on removal/installation of the fiber optical cable for the Media Oriented System Transport (MOST)	MODEL 211.0/2	AH82.60-P-0001-06T
i	Notes on auto-pilot system	MODEL 170	AH82.61-P-0001-01A

i	Notes on auto-pilot system	MODEL 129,208.4	AH82.61-P-0001-01B
i	Notes on auto-pilot system	MODEL 202.018/02 /12/13, 208.3, 210.0	AH82.61-P-0001-01C
i	Notes on auto-pilot system	MODEL 203 Navigations system APS 30	AH82.61-P-0001-01P
i	Notes on positioning GPS antenna, TrafficStar	MODEL 210 with CODE (581a) Automatic air conditioning MODEL 140	AH82.61-P-0001-02A
i	Notes on dynamic guidance for APS	MODEL 129, 140, 168, 170, 202, 208, 210 bei APS der 3. Gerategeneration	AH82.61-P-0001-04A
i	Notes on dynamic guidance for APS	MODEL 220 ...	AH82.61-P-0001-04B
i	Notes on dynamic navigation for APS	MODEL 215,220...	AH82.61-P-0001-04C
i	Notes on radio connector pin assignment	MODEL 163	**AH82.61-P-0001-05A**
i	Notes on TV antenna in rear window	MODEL 210.0 as of 1.7.99	AH82.62-P-0001-01A
i	Retrofitting voice control system	MODEL 210.### 1#	AH82.70-P-0001-01A
i	Notes on D2B ring	MODEL 210...	AH82.70-P-0001-03A
i	Notes on D2B ring	MODEL 210...	AH82.70-P-0001-03B
i	Notes on D2B ring	MODEL 210...	AH82.70-P-0001-03C
i	Notes on D2B ring	MODEL 202 ...	AH82.70-P-0001-03E
i	Notes on D2B ring	MODEL 202 ...	AH82.70-P-0001-03F
i	Notes on D2B ring	MODEL 170...	AH82.70-P-0001-03G
i	Notes on D2B ring	MODEL 208 ...	AH82.70-P-0001-03H
i	Notes on D2B ring	MODEL 208 ...	AH82.70-P-0001-03I
i	Notes on D2B ring	MODEL 215, 220	AH82.70-P-0001-03IA
i	Notes on D2B ring	MODEL 168...	AH82.70-P-0001-03J
i	Notes on telephone retrofitting	MODEL 129, 168, 170, 202, 208, 210 ...	AH82.70-P-0001-04A
i	Notes on retrofitting telephone	MODEL 129, 168, 170, 202, 208, 210 as of 1.7.00 up to 30.6.01 except CODE (855) TELE AID	AH82.70-P-0001-04B
i	Notes on retrofitting telephone	MODEL 215, 220 as of 1.7.00 up to 30.6.01 except CODE (855) TELE AID	AH82.70-P-0001-04C
	Notes on telephone	MODEL 215,220...	AH82.70-P-0001-10A

i	conversion for Tele Aid emergency call system		
i	Notes regarding the Tele-Aid emergency call system	MODEL 463 ...	AH82.95-P-0001-01GA
i	Notes regarding the Tele-Aid emergency call system	MODEL 199	AH82.95-P-0001-01SLR
i	Notes on Tele Aid emergency call system control module change	MODEL 140 with CODE (348) TELE AID emergency call system	AH82.95-P-0001-02A
(!)	Cleaning plastic cover plates of lamps	MODEL 168, 169, 171, 199, 203, 204, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245.2	AH82.10-P-1002-01A
(!)	Cleaning plastic cover plates of lamps	MODEL 454.0	AH82.10-P-1002-01FF
(!)	Notes on installation of wiring harnesses in roof area	MODEL 203.0	AH82.25-P-1000-01P
(!)	Notes on avoiding damage to fiber optic cables during repair work	MODEL 164, 169, 211, 216, 221, 245, 251, 454 ...	AH82.60-P-0001-05AK
(!)	Notes on avoiding damage to fiber optic cables during repair work	MODEL 219.3 with Media Oriented System Transport (MOST)	AH82.60-P-0001-05TX
(!)	Notes on fiber optic cable	MODEL 129, 163, 168, 170, 202, 203, 208, 209, 210, 215, 220, 230, 414, 463 ...	**AH82.70-P-0001-02A**

NOTES ON NAVIGATION SYSTEM TRAFFICSTAR - AH82.61-P-0001-03A

Models 129, 140, 163, 168, 170, 202, 208, 210

i

Customer information on GPS antenna installation location

On all sedans and coupes, the GPS antenna can be mounted on the rear shelf as an alternative to the instrument panel.

TrafficStar customer information

The TrafficStar navigation system is available in two versions from the Becker Company:

1. Mat black cover
2. Precious wood cover, burr walnut (Avant-garde)

Notes on installation of GPS antenna

The GPS antenna should be installed only in a vertical position with a maximum deviation of 10° from horizontal.

The GPS antenna should always have a free view of the sky. Thermal insulated windows can significantly reduce the function of the GPS antenna.

When installing the GPS antenna, always ensure that the arched surface points away from the vehicle.

Changing the installation location inside of the vehicle after the system is put into operation has no effect on the GPS reception.

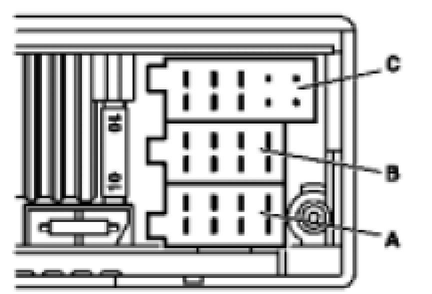
NOTES ON RADIO CONNECTOR PIN ASSIGNMENT - AH82.61-P-0001-05A

Model 163

The pin assignment in the radio connector has been changed on vehicles as of 07.99 (model year 2000)

The new pin assignment is:

PIN	Chamber A	Chamber B	Chamber C
1	GAL	NF right rear +	-
2	K lead	NF right rear -	-
3	Telephone mute	NF right front +	Back
4	C. 30	NF right front -	Wake-up lead
5	"Antenna" switch output	NF left front +	C. 30S for CDC
6	C. 58d	NF left front -	C. 31 for CDC
7	C. 15	NF left rear +	-
8	C. 31	NF left rear -	-



P82.61-2554-01

Fig. 1: Identifying Radio Connector Pin Assignment

Check pin assignment

- If the pin assignment is the same as listed in the table above, it is not necessary to install the adapter wiring harness and CAN bus adapter when installing the Audio 30 APS navigation system.

NOTES ON TELEPHONE OPERATION WITH AUDIO 30 APS NAVIGATION SYSTEM - AH82.61-P-0001-06A

Models 129, 163, 168, 170, 202, 208, 210

Vehicles with telephone code 316 or 317 can be retrofitted with an Audio 30 APS navigation system.

Ensure that the Audio 30 APS navigation system is a unit with part number A 208 820.....Older units with part number A 168 820 .. .. are not capable of assuming the master function in the D2B- ring.

i

The Audio 30 APS does not have a number pad. For this reason, it is not possible to control the telephone over the radio (see operating instructions).

On vehicles (as of approx. 07.99) with multifunction steering wheel (telephone control with keys on steering wheel) this function is then also possible with the Audio 30 APS navigation system.

NOTES ON TRAFFIC PRO NAVIGATION SYSTEM - AH82.61-P-0002-01A

Models 129, 140, 163, 168, 170, 202, 208, 210

i

i

Customer information, installation position for GPS antenna

There are two different installation locations for the GSP antenna:

1. Standard GPS antenna from DaimlerChrysler on roof or trunk lid. This version offers the best reception and is therefore preferable.
2. Use of magnetic antenna in vehicle passenger compartment. This version is part of the kit from the Becker company and installation is described in Becker installation instructions.

Notes on installation of Becker GPS antenna

The GPS antenna can only be installed horizontally with a maximum deviation of 10° from horizontal.

The GPS antenna should always have an unobstructed view of the sky. Tinted windows can reduce the function of the GPS antenna considerably.

When installing the GPS antenna always ensure that the arched surface of the antenna points upwards.

NOTES ON FIBER OPTIC CABLE - AH82.70-P-0001-02A

Model 129, 163, 168, 170, 202, 203, 208, 209, 210, 215, 220, 230, 414, 463.243/244/245/246/247/248/249/250/254/270/271/303/309/322/323/332/333/340/341

Illustrated on Model 202 sedan

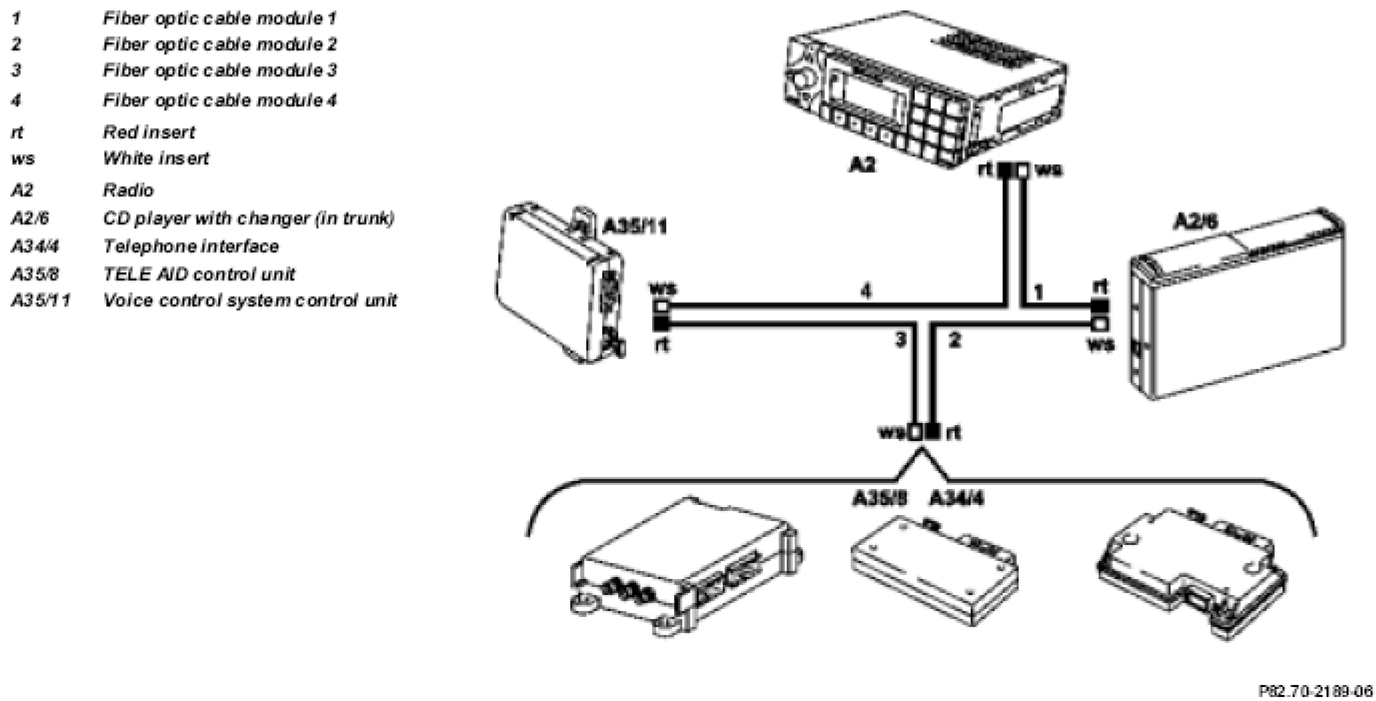


Fig. 2: Identifying Fiber Optic Cable Module, CD Player With Changer (In Trunk) And Voice Control System Control Unit

Position of the identification

For vehicle models 170, 202, 203, 208, 210, 215, 220, 230, 463 an identification plate is located on the fiber optic cable wiring harness behind the radio on which the fiber optic cable modules (1, 2, 3, 4) specially fitted to these vehicles are specified together with their exact length.

With models 129, 414 the identification plate is in the trunk next to the CD changer.

With model 168, the identification plate is in the passenger footwell in the area of the control unit box. If there is no length specification on the identification plate, the respective fiber optic cable module must be removed and the necessary length measured.

[i] Vehicle model 163 does not have any identification plate.

[i] With repairs, the individual fiber optic cable modules with corresponding length specification can be ordered (see spare-parts documentation Group 82).

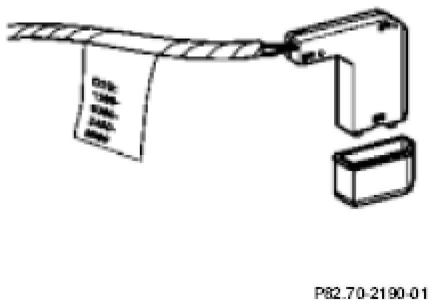


Fig. 3: Identifying Position Of Identification On Fiber Optic Cable Wiring Harness

Routing

The inserts (5) of the fiber optic cable modules may only be routed as in production. The fiber optic cable modules must always be provided with a protective cap when routing. For every vehicle model, the sequence of components in the D2B ring is specifically predetermined. The components are connected by fiber optic cable modules. They are secured to a wiring harness with an orange-colored casing.

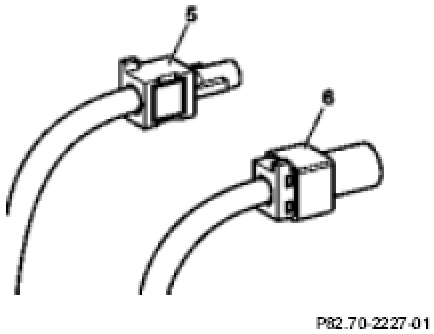


Fig. 4: Identifying Fiber Optic Cable Modules Insert

Danger of breaking! Do not kink fiber optic cable, route over sharp edges or bend in radii smaller than 25 mm. Tensile forces on inserts must not exceed 65 N.

The fiber optic cable must not be exposed to temperatures greater than 85°C or lower than -40°C. Do not squeeze fiber optic cable, in other words do not compress with clamps or cable ties.

Connection between the devices

The Digital Data Bus ring (D2B) connects the new radio generation and COMAND (monitor) to the CD changer (CDC) (USA preinstallation), telephone and portable CTEL. The sound amplifier remains wired as COMAND (monitor) to the CD changer (CDC) (USA preinstallation), telephone and portable CTEL. The sound amplifier remains wired as before with Models 129, 170, 202, 208 and 210. The radio and COMAND as head unit (HU) performs the master function and also forms the interface to the Control Area Network bus Class B (interior) (CAN-B) (for vehicles with multifunction steering wheel).

Ring sequence of vehicles/models/interface

Model 129 HU - telephone (or Tele Aid) - CDC - HU

Model 163 HU - Sound - CDC - telephone (or TELE AID) - HU

Model 168 HU - telephone - CDC - HU

Model 170 HU - telephone - HU (ECE); HU - CDC - HU (Japan)

Model 202/208 HU - CDC - telephone (or Tele Aid) - VCS - HU

Model 203/209 HU - sound - portable CTEL interface - VCS - CDC - HU

Model 210 HU - CDC - VCS - telephone (or TELE AID) - HU

Model 215/220 HU - sound - CDC - telephone (or Tele Aid) - VCS - optional portable CTEL interface - HU

Model 230 HU - Sound - CDC - Telephone (or TELE AID) - SBS - HU

Model 414/463 HU - CDC - telephone - HU

i The sequence represents the current maximum equipment. If special equipment (SA) is omitted, the respective item is deleted, resulting in a new ring sequence.

Read out actual configuration using STAR DIAGNOSIS

As of September 1999 it is possible to read out the current actual configuration of a functioning D2B ring by means of STAR DIAGNOSIS. This is particularly important in the case of later expansion of the D2B ring and when retrofitting D2B components e.g. telephone.

In the diagnosis system there is the menu item "Retrofitting D2B components". Under this menu item, the current actual configuration of a vehicle can be read out and written back immediately as a new nominal configuration. The process is self-explanatory.

BASIC KNOWLEDGE

DIGITAL DATA BUS (D2B), FUNCTION - GF82.00-P-0001A

MODEL 129 as of 1.6.98, 163, 168 as of 1.9.98, 170, 202 as of 1.6.98, 203, 208, 210 as of 1.6.98, 215, 220

Component sequence, exemplified on model 220 with code (819) 6-disc CD changer, with code (810) sound system, with code (813) voice control system (VCS) and with code (855) TELE AID

1	*Wake-up*
A2	*Radio*
A2/6	*CD changer (in trunk)*
A2/13	*Sound amplifier*
A35/11	*Voice control system control unit*
A35/17	*Telephone and TELE AID transmitter/receiver, D2B*
X11/4	*Data link connector*

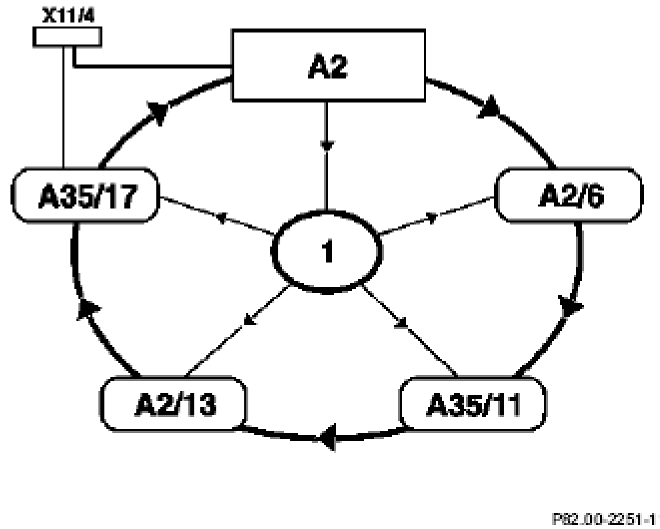


Fig. 5: Identifying Digital Data Bus (D2B), Function

Digital Data Bus (D2B)

The Digital Data Bus (D2B) is a data transmission system for the communication and information components, which utilizes the optical data transfer options. Data transfer is conducted by means of optical pulses, which are transferred over fiber optical cables to the connected communication and information components. Audio and command signals are converted in the source components into optical pulses and transmitted via fiber optical cables. The optical signal is converted back to an electronic signal in the target component. Because of the high transfer rate, the Digital Data Bus (D2B) can transfer audio and command signals simultaneously. Simultaneous transfer of source data and command data over the Digital Data Bus (D2B) significantly reduces the amount of cabling. The connected components require 2 lines for the voltage supply (electrical) and 2 lines (input/output) for the fiber optical cable of the Digital Data Bus (D2B) and one line for the wake-up signal (electrical).

In addition to this the fiber optical cable can transfer several pieces of source data simultaneously (e.g. music and voice from 2 components), without compromising the data content.

Functional sequence on example of "Play CD" on model 220

Pressing "Play" on the radio (A2) sends a command signal over the Digital Data Bus (D2B) to the CD player with changer (in trunk) (A2/6), for vehicles with code (819) 6-disc CD changer. The audio signals from the CD player with changer (in the trunk) (A2/6), for vehicles with code (819) 6-disc CD changer, are then sent over the Digital Data Bus(D2B) as source data to the Sound amplifier (A2/13), or for vehicles with code (810) to the sound system. The target components, the Sound amplifier (A2/13), or for vehicles with code (810) the sound system, the source data are then converted back to electrical signals and reproduced as sound.

Data transfer using fiber optic cables has the following advantages:

- Extremely high data transmission rate
- Prevents tapping and cross talk
- Insensitive to electromagnetic radiation

- Short-circuit resistance
- Zero potential connection of components
- No oxidation
- Low weight of fiber optical cable
- Minimum diameter of wiring harness

The digital data bus (D2B) has a closed ring structure. The communication and data components are arranged here in a distributor line (in-series circuit). This arrangement is type specific and is illustrated by way of an example on model 220 as follows:

- Radio (A2)
- CD player with changer (in trunk) (A2/6), with code (819) 6-disc CD changer
- Sound amplifier (A2/13), with code (810) Sound System
- Voice control system control unit (A35/11), with code (813) voice control system (VCS)
- Telephone and TELE AID transmitter/receiver, D2B (A35/17), with code (855) TELE AID

Data transfer is conducted here in one direction only, i.e. the optical pulses for the voice control system control unit (A35/11), for vehicles with code (813) voice control system (VCS), on model 220 pass through all components connected to the ring, before arriving at the target components.

When the system is first put into operation, a system test is performed. In doing so the individual components and their sequence in the ring structure of the Digital Data Bus (D2B) are registered by the component with the master function.

A type-specific sequence is stored ex-factory. In turn, the storing of a sequence ex-factory means: if the radio (A2) is taken from one model series and installed into another one, then during a system test the different sequence of the components and an error message are filed in the diagnostic trouble code memory.

An error message is also filed if the radio (A2) is exchanged within a model series with different equipment components. The system goes to the operational state regardless of the error message. STAR DIAGNOSIS enables the sequence of the components to be subsequently altered in the Digital Data Bus (D2B).

i The Digital Data Bus (D2B) is diagnosis capable via the data link connector (X11/4), except for models 129 and 202.

i The operating principle of the Digital Data Bus (D2B) is the same for all model series; all that changes is the sequence of components depending on the national version and equipment specification.

	Data transfer, function		**GF82.00-P-2000A**

TABLE OF CONTENTS, FUNCTION DESCRIPTION OF DIGITAL DATA BUS (D2B) - GF82.00-P-0999ZZ

MODEL 129 as of 1.6.98, 163, 168 as of 1.9.98, 170, 202 as of 1.6.98, 203, 208, 210 as of 1.6.98, 215, 220

	Digital data bus (D2B), function		**GF82.00-P-0001A**
	Data transfer, function		**GF82.00-P-2000A**
	Wake-up, function		**GF82.00-P-2001A**
	Survey of system components, digital data bus (D2B), location/task/design/function		**GF82.00-P-9999A**

DATA TRANSFER, FUNCTION - GF82.00-P-2000A

MODEL 129 as of 1.6.98, 163, 168 as of 1.9.98, 170, 202 as of 1.6.98, 203, 208, 210 as of 1.6.98, 215, 220

The Digital Data Bus (D2B) contains the master unit, e.g. the radio (A2) except for model 129, and model 202, which triggers all the components in the Digital Data Bus system (D2B). The master unit also serves as an interface (Gateway) to the CAN interior (CAN-B). For this purpose, signals arriving at the master unit are converted so that they can be transmitted from the Digital Data Bus (D2B) to the CAN interior (CAN B) and vice versa. Moreover, the master unit serves as a timing circuit which provides the clock pulse with which the information frames are transferred on the Digital Data Bus (D2B). A frame consists of 2 subframes. A series of many data frames contains the complete information for proper operation of the components located at the Digital Data Bus (D2B). The conversion of optical pulses into electrical signals and vice versa is done by transmitter and receiver diodes, that are integrated into each component. Each of the components receives or transmits the electrical signals from the chip of the Digital Data Bus system (D2B) as a "D2B log". Source data and control data are transmitted.

The source data are transferred synchronously, for example as present on a music CD, as 32 bit blocks into the subframes. By contrast, control data are transferred asynchronously. They are divided up (2 bits per subframe) and distributed over several subframes. The control data are provided with an address, which indicates for which components the data are intended in the Digital Data Bus (D2B). The individual data packages are joined together again in the components and they can then be processed. A data frame can therefore contain highly differing types of information (source and control data from all components mounted in the digital data bus (D2B)). The transmission and reception diodes as well as the digital data bus (D2B) chip are switched off when not required in order to reduce the quiescent current (sleep mode). Switch-off is accomplished immediately when the master unit or circuit 15 is switched off. After restart, the digital data bus system (D2B) can be activated either by the components or by the master unit by means of an electrical signal in the wake-up line for optical data transmission.

Regardless whether the information is intended for a component, it feeds an edited light signal back into the digital data bus (D2B) at full intensity (repeater function).

	Wake-up, function		**GF82.00-P-2001A**

WAKE-UP, FUNCTION - GF82.00-P-2001A

MODEL 129 as of 1.6.98, 163, 168 as of 1.9.98, 170, 202 as of 1.6.98, 203, 208, 210 as of 1.6.98, 215, 220

Normal wake-up

Since the transmitting and receiving diodes along with the digital data bus system's (D2B) chip are automatically shut off if they are not needed (sleep mode), a wake-up pulse, which activates the system, is required to start a new data transfer. This is accomplished via the separate wake-up line. For this purpose, the master unit actuates the wake-up signal (electrical signal), which allows the voltage in the wake-up line to decrease to a defined value. The chip of the digital data bus system (D2B) in the components recognizes on account of the duration of the signal that this is a wake-up signal, and the digital data bus (D2B) is then activated. Therefore the digital data bus (D2B) is then in an activated state. A "wake-up" can take place in a quiescent system (sleep mode) even without the wake-up pulse of the master unit by activation of a component located at the digital data bus (D2B).

Wake-up diagnosis

For diagnosis of the wake-up circuit in the components, the master unit can trigger a wake-up diagnosis signal using STAR DIAGNOSIS and the data link connector (X11/4). This signal differs from the wake-up signal by the fact that it has a significantly longer duration. The components react to this long wake-up pulse with a signal on the wake-up line (message to master unit). This allows the master unit to recognize which components have received the long wake-up pulse. The wake-up diagnosis signal can only be actuated when the digital data bus (D2B) cannot be activated due to an error. If all components reply to the master unit, then their voltage supply is correct.

	Fiber optical cable, location/task/function	Except model 208.4	**GF82.00-P-4000A**

FIBER OPTIC CABLE, LOCATION - GF82.00-P-4000-01GH

Model 163

Components for ECE version

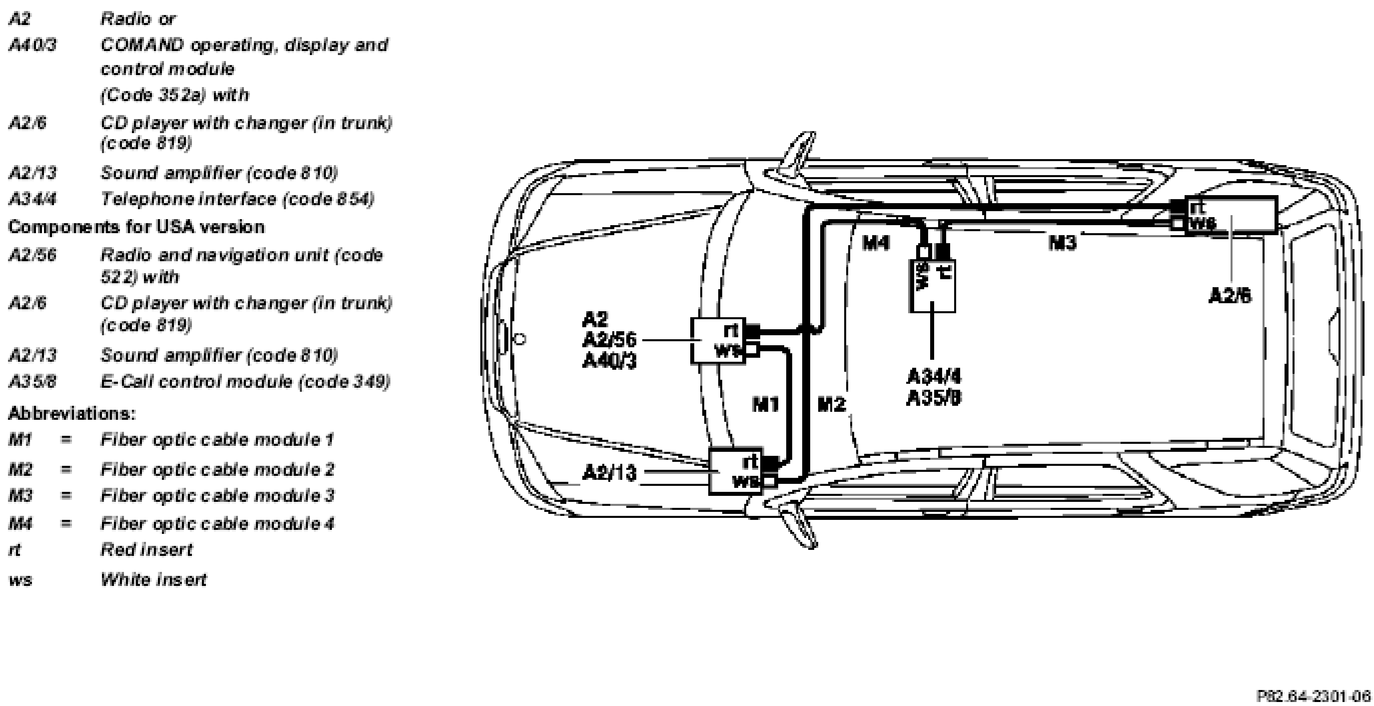


Fig. 6: Identifying Fiber Optic Cable Components Location

FIBER OPTIC CABLE, FUNCTION - GF82.00-P-4000-04A

The fiber optical cable consists of plastic with a fiber diameter of 1 mm. Each fiber optical cable is protected against mechanical damage and against admission of outside light with the help of an orange-colored insulation. The light for the data transfer in the digital data bus (D2B) has a wavelength of 650 nm; by comparison, visible light lies in the range of blue with 400 nm to red with 800 nm. Optical attenuation of the light signal can occur in the fiber optic cable. Attenuation of the optical signal in the fiber optical cable is dependent on:

- the length of the line between the individual components
- the bending radii when routing the fiber optical cable, which must have min. bending radius = 25 mm
- the condition of the insulation of the fiber optical cable
- A passive connector; this is used when a component is removed from the digital data bus (D2B) due to a fault.

To ensure the functional availability of the remaining components, the digital data bus (D2B) is closed again using a passive connector. The fiber optical cable has two different connection ends:

- The fiber optical cable input, which is the output to each control unit. This is marked in "white".
- The fiber optical cable output, which is the input to each control unit. This is marked in "red".

FIBER OPTIC CABLE, LOCATION/TASK/FUNCTION - GF82.00-P-4000A

MODEL 129 as of 1.6.98, 163, 168 as of 1.9.98, 170, 202 as of 1.6.98, 203, 208.3, 210 as of 1.6.98, 215, 220

Exemplified on model 215 with code (819) 6-disc CD changer, with code (810) Sound System and with code (382) MB phone "CTEL" in console on right side of dome

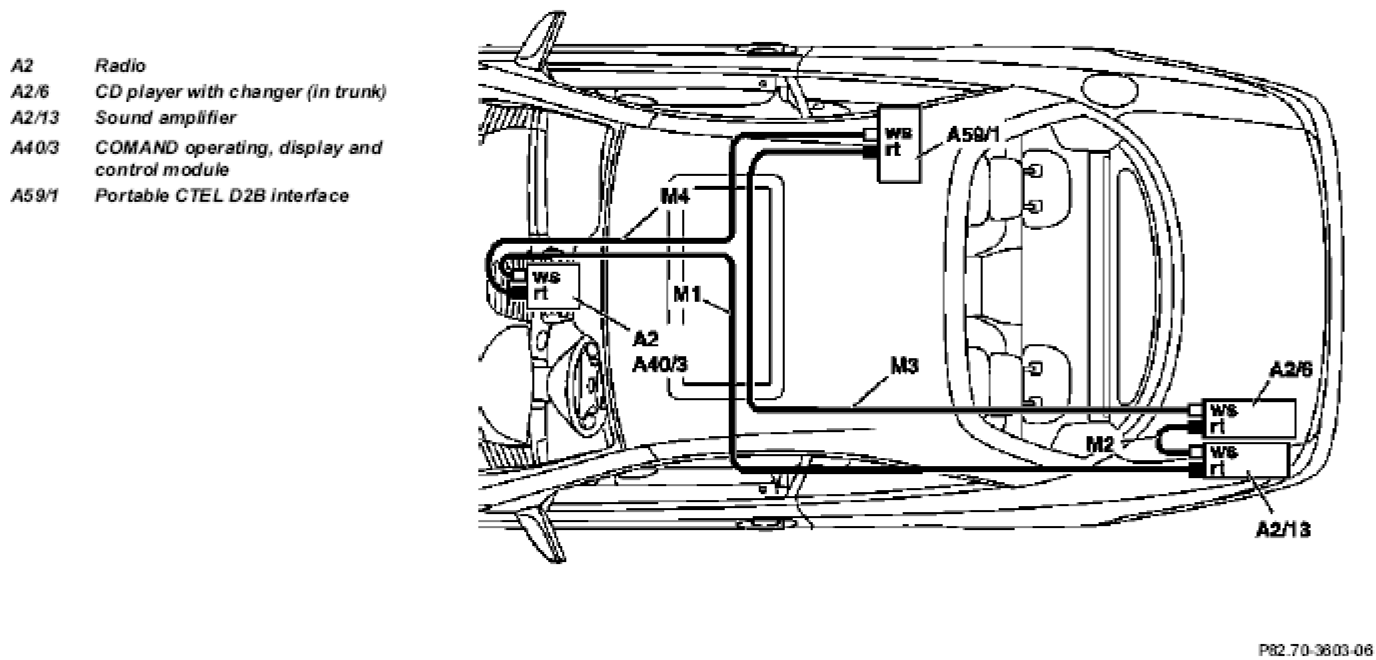


Fig. 7: Identifying Fiber Optic Cable, Location/Task/Function

	Fiber optic cable, location	Model 129 Model 163 as of 01.09.01 Model 168 Model 170 Model 202, 208 Model 203 Model 210 Models 215, 220	GF82.00-P-4000-01D **GF82.00-P-4000-01GH** GF82.00-P-4000-01E GF82.00-P-4000-01C GF82.00-P-4000-01B GF82.00-P-4000-01G GF82.00-P-4000-01A GF82.00-P-4000-01F
	Fiber optic cable, purpose	The fiber optical cable is responsible for the optical data transfer of the components located at the digital data bus (D2B).	
	Fiber optic cable, function		**GF82.00-P-4000-04A**

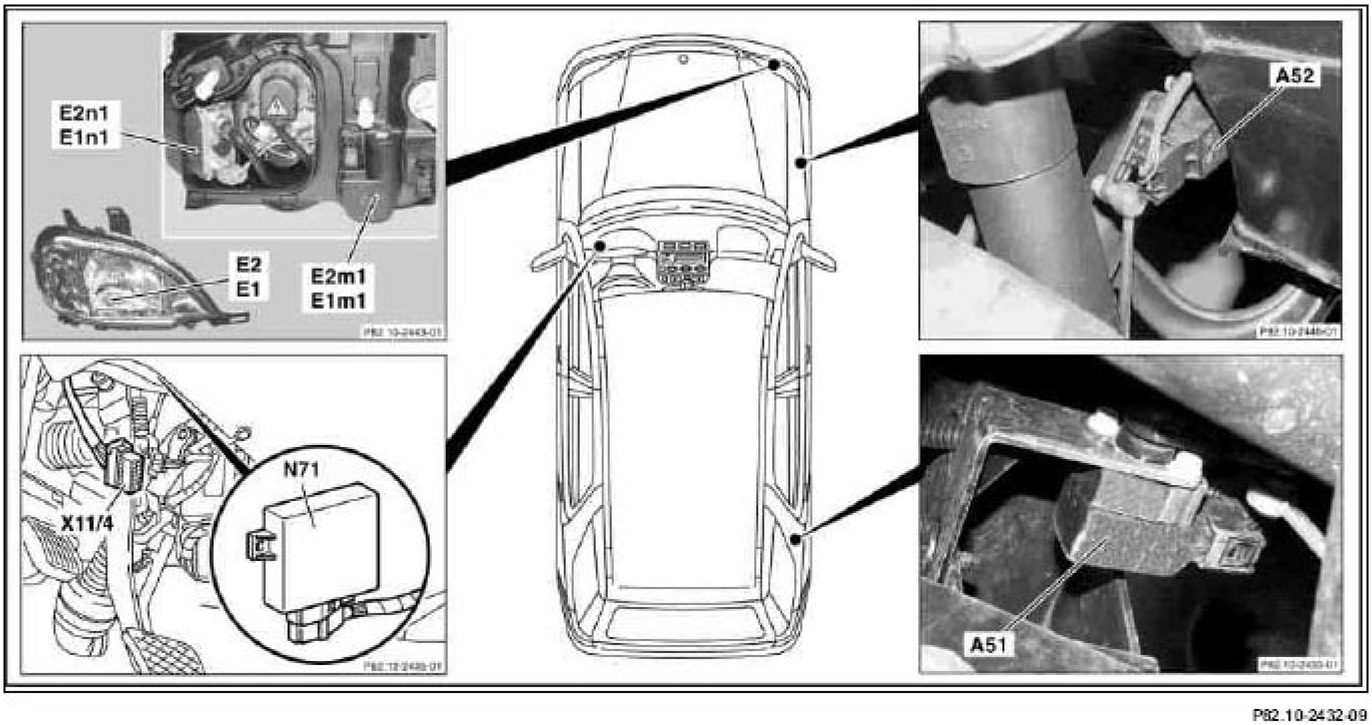
SURVEY OF SYSTEM COMPONENTS, DIGITAL DATA BUS (D2B), LOCATION/ TASK/DESIGN/FUNCTION - GF82.00-P-9999A

MODEL 129 as of 1.6.98, 163, 168 as of 1.9.98, 170, 202 as of 1.6.98, 203, 208, 210 as of 1.6.98, 215, 220

	Fiber optic cable,	Except model 208.4	**GF82.00-P-4000A**

	location/task/function		
	Table of contents, function description of digital data bus (D2B)		**GF82.00-P-0999ZZ**

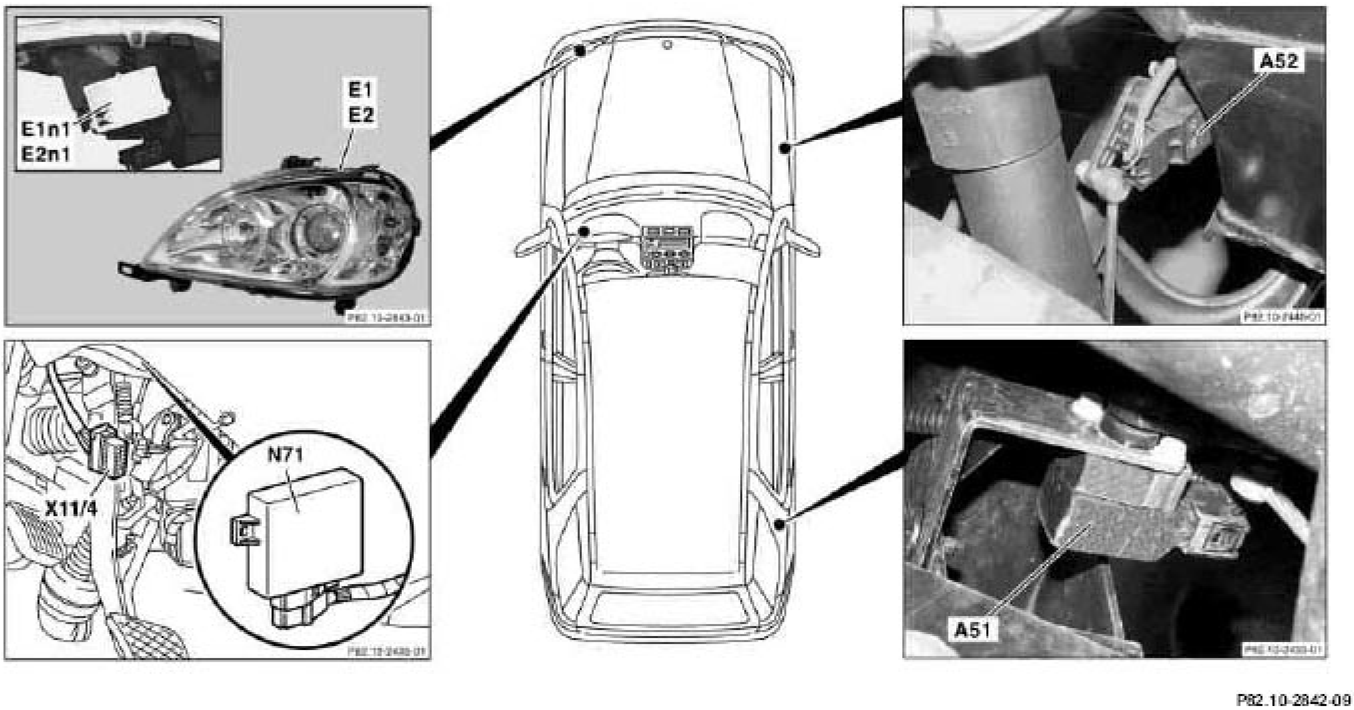
HEADLAMP RANGE ADJUSTMENT (HRA), LOCATION OF COMPONENTS - GF82.10-P-0001-01GH



A51	Rear axle sensor (headlamp range adjustment)	E1m1	Left headlamp range adjustment motor
A52	Front axle sensor (headlamp range adjustment)	E2m1	Right headlamp range adjustment motor
E1	Left front headlamp unit	N71	Headlamp range adjustment control module
E2	Right front headlamp unit		

Fig. 8: Identifying Headlamp Range Adjustment (HRA) Components

HEADLAMP RANGE ADJUSTMENT (HRA), LOCATION OF COMPONENTS - GF82.10-P-0001-01GHA



A51 Rear axle sensor (headlamp range adjustment)
A52 Front axle sensor (headlamp range adjustment)
E1 Left front headlamp unit
E2 Right front headlamp unit
Left xenon headlamp control module
Right xenon headlamp control module
N71 Headlamp range adjustment control module

Fig. 9: Identifying Headlamp Range Adjustment (HRA) Components

HEADLAMP RANGE ADJUSTMENT (HRA), FUNCTION - GF82.10-P-0001GH

MODELS 163.113 /136 /154 /172 /174 up to 31.8.01 with CODE (612b) Xenon headlamp unit with CODE (U47) Conversion package

Function

The electrical headlamp range adjustment operates dynamically. Every change in the vehicle level is determined and signaled to the headlamp range adjustment control module (N71) by the rear axle sensor and the front axle sensor (A51, A52). The control module (N71) compares the vehicle level and the headlamp position. If necessary, the headlamp setting is corrected by the control module (N71) via the headlamp range adjustment motors (E1m1, E2m2). The headlamp position is only corrected if a modified vehicle level is signaled to the control module (N71) by the front and rear axle sensors (A51, A52) for a specific time span.

Headlamp range adjustment control module (N71)

The headlamp range adjustment control module (N71) processes the signals from the front and rear axle sensors (A51, A52) as well as the position of the headlamp range adjustment motors (E1m1, E2m1). After evaluating these signals, commands are sent to the headlamp range adjustment motors (E1m1, E2m1).

Front and rear axle sensors (A51, A52)

A sensor is fitted to the front axle and to the rear axle and the sensors pick up the instantaneous vehicle level at the control arm. These sensors (A51, A52) transmit the determined vehicle level to the control module (N71).

Headlamp range adjustment motor (E1m1, E2m1)

The position of the reflectors is signaled to the headlamp range adjustment control module (N71) by a potentiometer in the headlamp range adjustment motor. The motors (E1 m1, E2m1) receive a command from the control module (N71) for correcting the headlamp position. If the low beam is switched on and the key is in position 2, the motors are referenced. The reflectors are moved to the lowest position and then, depending on the vehicle level, moved to the correct position.

	Headlamp range control (HRC), location of components		GF82.10-P-0001-01GH

HEADLAMP RANGE ADJUSTMENT (HRA), FUNCTION - GF82.10-P-0001GHA

MODELS 163.113 /128 /154 /172 /174 as of 1.9.01, 163.157 with CODE (614) Bi-xenon headlamp unit

Function

The electrical headlamp range adjustment operates dynamically. Every change in the vehicle level is determined and signaled to the headlamp range adjustment control module (N71) by the rear axle sensor and the front axle sensor (A51, A52). The control module (N71) compares the vehicle level and the headlamp position. If necessary, the headlamp setting is corrected by the control module (N71) via the headlamp range adjustment motors (E1m1, E2m2). The headlamp position is only corrected if a modified vehicle level is signaled to the control module (N71) by the front and rear axle sensors (A51, A52) for a specific time span.

Headlamp range adjustment control module (N71)

The headlamp range adjustment control module (N71) processes the signals from the front and rear axle sensors (A51, A52) as well as the position of the headlamp range adjustment motors (E1m1, E2m1). After evaluating these signals, commands are sent to the headlamp range adjustment motors (E1m1, E2m1).

Front and rear axle sensors (A51, A52)

A sensor is fitted to the front axle and to the rear axle and the sensors pick up the instantaneous vehicle level at the control arm. These sensors (A51, A52) transmit the determined vehicle level to the control module (N71).

Headlamp range adjustment motor (E1m1, E2m1)

The position of the reflectors is signaled to the headlamp range adjustment control module (N71) by a potentiometer in the headlamp range adjustment motor. The motors (E1 m1, E2m1) receive a command from the control module (N71) for correcting the headlamp position. If the low beam is switched on and the key is in position 2, the motors are referenced. The reflectors are moved to the lowest position and then, depending on the vehicle level, moved to the correct position.

	Headlamp range control (HRC), location of components		**GF82.10-P-0001-01GHA**

CONTENTS - FUNCTION DESCRIPTION OF EXTERIOR LIGHTING - GF82.10-P-0999A

MODELS 129, 140, 163 up to 31.08.01, 202, 208, 210 with CODE (612b) xenon headlamp unit

MODEL 163 as of 1.9.01 with CODE (614) Bi-xenon headlamp unit

MODEL 202 with CODE (236a) Special light circuit for daytime running lamps

	Exterior lights, function	Models 129, 140, 202, 208, 210, with Code 612b lamp unit for Xenon headlamp	GF82.10-P-0003A
	Electrical headlamp range adjustment (HRA), location of components	MODEL 208 with code 612b xenon headlamp unit	GF82.10-P-0001-01A
		Model 210 with code 612b xenon headlamp lamp unit	GF82.10-P-0001-01B
		Model 129 with code 612b xenon headlamp lamp unit	GF82.10-P-0001-01C
		Model 140 with code 612b xenon headlamp lamp unit	GF82.10-P-0001-01D
		Model 202 with code 612b xenon headlamp unit	GF82.10-P-0001-01E
		Model 163, up to 31.08.01	**GF82.10-P-0001-01GH**
		Model 163 as of 1.09.01	**GF82.10-P-0001-01GHA**
	Xenon headlamp (XENON), location of components	Models 129, 140, 208, 210 with code 612b xenon headlamp lamp unit	GF82.10-P-0002-01A
		Model 202 with code 612b xenon headlamp unit	GF82.10-P-0002-01B
	Headlamp range adjustment, function	Models 129, 140, 202, 208, 210 with code 612b xenon headlamp unit	GF82.10-P-0001A

		Model 163, up to 31.08.01 Model 163 as of 1.09.01	**GF82.10-P-0001GH** **GF82.10-P-0001GHA**
	Xenon headlamps, function	Model 163, up to 31.08.01 Model 163 as of 1.09.01	**GF82.10-P-2007-01GH** **GF82.10-P-2007-01GHA**
	Automatic driving light actuation, function	Model 163 as of 01.09.01	**GF82.10-P-3003GH**
	Daytime running light control, function	Model 163 as of 01.09.01	**GF82.10-P-3005GH**
	Locator lighting, function	Model 163 as of 01.09.01	**GF80.20-P-2008GH**
	Headlamp cut-in, function	Model 163 as of 01.09.01	**GF80.20-P-2003GH**
	Daytime running lights, function	Model 202 with Code 236a special lamp circuit for daytime running lamps	GF82.10-P-2002A
	Contents - Function description of exterior lighting, location/task/design/function	Models 129, 140, 163, 202, 208, 210 with code 612b xenon headlamp unit	**GF82.10-P-9999B**

XENON HEADLAMPS, FUNCTION - GF82.10-P-2007-01GH

Function

The combustion chamber of the xenon lamp is filled with xenon and a mixture of metal halide salts. This mixture is ignited by high voltage. The color of the light has a characteristic similar to daylight.

When the low beam lamps are switched on the xenon headlamp control module (E1 n1, E2n1) activates the xenon headlamp control module and ignition module (E1n2, E2n2) via the control voltage within a few milliseconds.

As a result of a high voltage surge (approx. 20 kV) of the ignition device, an arc forms between the electrodes, and the xenon lamp is ignited.

When an arc of sufficient stability is detected, the control electronics of the xenon lamp control module (E1n1, E2n1) switches over to power-limiting mode. The electric power is regulated to 35 W. A voltage converter generates the voltage of approx. 85 V (~) necessary for the reliable function of the xenon lamp. For technical reasons the xenon lamp has a timed startup characteristic. After switching on, 50 % of the luminosity is reached within 1 to 2 seconds and full luminosity is reached after approx. 30 seconds.

XENON HEADLAMPS, FUNCTION - GF82.10-P-2007-01GHA

The lighting technology, known as **bi-xenon 70** , is located in the outer headlamps.

When the low beam lamps are switched on the xenon headlamp control module (E1 n1, E2n1) activates the xenon headlamp control module and ignition module (E1n2, E2n2) via the control voltage within a few milliseconds.

A high-voltage surge from the ignition device ignites the xenon lamps, and in doing so an electric arc is formed between the electrodes. When an arc of sufficient stability is detected, the control electronics of the control module (E1 n1, E2n1) switches over to power-limiting mode.

The light generated previously in a gas discharge lamp (D2S lamp) is not reflected in bi-xenon 70 headlamps, but instead it is sent directly through a lens optical system with a lens diameter of 70 mm.

Using the mask (B), which is positioned between the gas discharge lamp and the lens optical system, the beam of light is partially masked for the low beam so that oncoming traffic is not blinded.

For the high beam, the mask (B) is electro-mechanically folded to the side using the solenoid (M).

[i] If the solenoid (M) should fail or a supply line breaks, the mask (B) remains mechanically held in the low beam position, always between the gas discharge lamp and the lens optical system.

In order to make the extremely bright light more acceptable to other road users, the lens aperture area with its dotted characteristic is optically enlarged.

This is possible on account of the specially formed areas which surround the lens. In addition, the light can pass through a number of chrome-plated strips from the rear. A portion of the diffused light is intercepted by the lower section of the surface area and reflected to the upper section of the chrome-plated longitudinal strips.

[i]

For technical reasons the xenon lamp has a timed startup characteristic. After switch on, 50 % of the luminosity is reached within 1 to 2 seconds and full luminosity is achieved after another approx. 30 seconds.

XENON HEADLAMP, LOCATION/DESIGN/FUNCTION - GF82.10-P-2007GH

MODELS 163.113 /136 /154 /172 up to 31.08.01 with CODE (612b) xenon headlamp unit with CODE (U47) conversion package

MODELS 163.174 up to 31.08.01, 163.113 /128 /136 /154 /172 as of 01.09.01

Design:

[i] From model year 2002 (as of 1.9.01) the xenon headlamps are installed as standard.

E1 *Left front headlamp unit*
E1n1 *Xenon headlamp control unit*
E2 *Right front headlamp unit*
E2n1 *Xenon headlamp control unit*

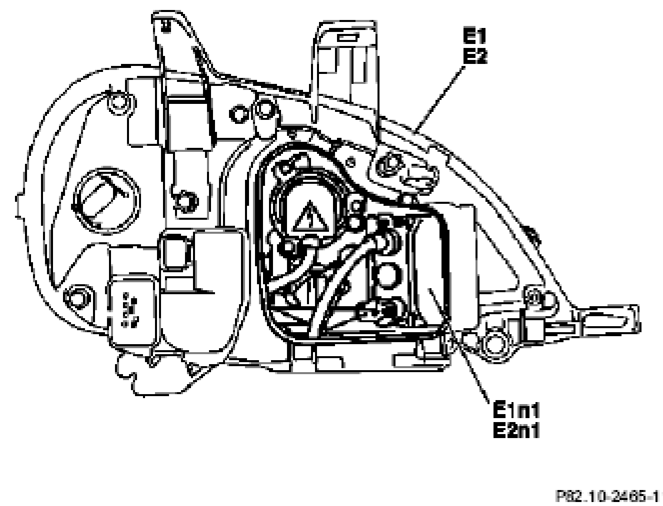


Fig. 10: Identifying Xenon Headlamp Components

	Xenon headlamps, function	Models 163.113, 163.136, 163.154, 163.172, 163.174 up to 31.08.01	**GF82.10-P-2007-01GH**

XENON HEADLAMP, LOCATION/DESIGN/FUNCTION - GF82.10-P-2007GHA

MODELS 163.113 /128 /154 as of 1.9.01, 163.157, 163.172 /174 as of 1.9.01 with CODE (614) Bi-xenon headlamp unit

Design:

B	*Mask*
M	*Solenoid*
E1	*Left front headlamp unit*
E1n1	*Xenon headlamp control unit*
E2	*Right front headlamp unit*
E2n1	*Xenon headlamp control unit*

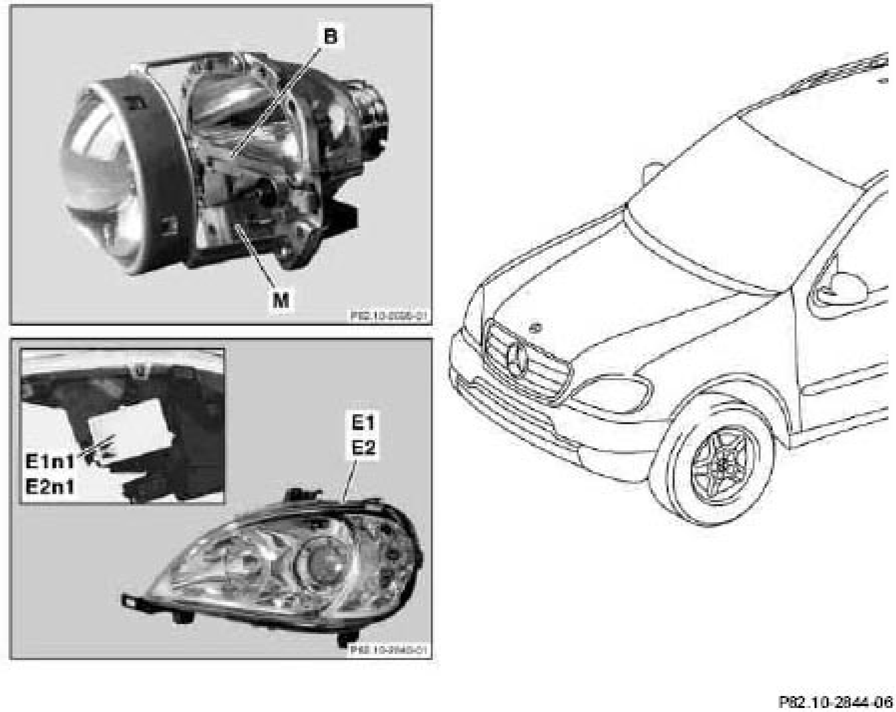


Fig. 11: Identifying Xenon Headlamp Components Location/Design

	Xenon headlamps, function		**GF82.10-P-2007-01GHA**

AUTOMATIC DRIVING LIGHT ACTUATION, FUNCTION - GF82.10-P-3003GH

MODEL 163 as of 01.09.01

The **Automatic Driving Light Actuation** automatically switches on the driving lights (side lamps, low beams and license plate lamps), depending on the exterior lighting conditions (rain, snow, dusk and darkness).

Function prerequisites:

- Exterior lamp switch in "AUTO" position
- Circuit 15 "ON"
- The sun sensor (B32) signals "Darkness" or the rain sensor (B38) signals "Rain"

Basic prerequisites for automatic driving light actuation are:

- diminishing daylight intensity at dusk
- darkness (tunnel, underground garage, ...)
- rain or snowfall and
- failure of rain/sun sensor ("Darkness" is signaled continuously)

i Fog and other lighting influences, e.g., due to oncoming traffic, do not have any effect on the automatic driving light actuation.

i **Automatic driving light actuation when starting a journey and during it**

- Automatic driving light actuation with driving lights is only possible when the engine is running (circuit 61 ON).
- When the engine is switched off and the electronic starter switch is in position "2" (circuit 15 ON) only the side lamps and the license plate lamps are actuated.
- Driving light actuation is disabled as soon as one of the basic prerequisites changes, e.g. when changing from darkness to daylight after driving through a tunnel.

i **Automatic driving light actuation at the end of a journey or in darkness**

- After switching off the engine (circuit 61 OFF) and when the electronic starter switch is in position "2" (circuit 15 ON), only the side lamps and the license plate lamps remain on.
- The exterior lighting is switched off as of key position "1" (circuit 15R).

	Table of contents, function description for exterior lighting		**GF82.10-P-0999A**

DAYTIME RUNNING LIGHT ACTUATION, FUNCTION - GF82.10-P-3005GH

MODEL 163 as of 01.09.01

With **daytime running lamps** the low beam, the side lamps and the license plate lamps are switched on if the engine is running (there are national variants).

Function prerequisites:

- Circuit 61 "ON"

i In "AUTO" position of the exterior lamp switch **daytime running lamps and automatic driving lights are OR** gated, i.e. depending on the prerequisites daytime running lamps or automatic driving lights are switched on.

i For the daytime running lamp conditions, there is no difference between the positions "0" and "AUTO" of the exterior lamp switch.

Corresponding to the national legislation, the **daytime running lamps** can be coded in different variants via Star Diagnosis.

Canada and USA

- during the day only the low beam is on
- when dark, the side lamps, license plate lamps as well as the switch and controls illumination (circuit 58d) are switched on
- With halogen headlights the low beam is operated during the day with a reduced voltage
- The lighting switches off automatically if the gearshift lever remains in "P" or "N" position for more than 3 min

Scandinavia

- with daytime running lamps the low beam, the side lamps and the license plate lamps are active
- the daytime running lamps switch off if the light switch assumes the "side lamps ON" position

Other countries

- with daytime running lamps the low beam, the side lamps and the license plate lamps are active
- the daytime running lamps are always active

The high beams can only be switched on if the exterior lamp switch:

- is at "low beam"
- is at "AUTO" and "Darkness" is detected
- daytime running lamps for "Other countries" has been coded

	Automatic driving light actuation, function		**GF82.10-P-3003GH**
	Table of contents, function description for exterior lighting		**GF82.10-P-0999A**

CONTENTS - FUNCTION DESCRIPTION OF EXTERIOR LIGHTING, LOCATION/ PURPOSE/DESIGN/FUNCTION - GF82.10-P-9999B

MODELS 129, 140, 202, 208, 210, 163 up to 31.08.01 with CODE (612b) xenon headlamp unit

MODEL 163 as of 01.09.01 with CODE (614) bi-xenon headlamp unit

	Axle sensor for headlamp range adjustment, location/task	MODELS 129, 140, 202, 208, 210 with code 612b xenon headlamp unit	GF82.10-P-2100A
	Headlamp range adjustment motor, location/ task	MODELS 129, 140, 202, 208, 210 with code 612b xenon headlamp unit	GF82.10-P-2101A

	Control module for headlamp range adjustment, location/task	MODELS 129, 140, 202, 208, 210 with code 612b xenon headlamp unit	GF82.10-P-2102A
	Xenon headlamp, position/function	MODELS 129, 140, 202, 208, 210 with code 612b xenon headlamp unit	GF82.10-P-2001A
	Xenon headlamp, position/function	Model 215	GF82.10-P-2001B
	Xenon headlamp, position/design/function	MODEL 163 up to 31.08.01	**GF82.10-P-2007GH**
		MODEL 163 as of 01.09.01	**GF82.10-P-2007GHA**
	Xenon headlamp control module, location/task	MODELS 129, 140, 202, 208, 210 with code 612b xenon headlamp unit	GF82.10-P-2104A
	Xenon headlamp ignition module, location/task	MODELS 129, 140, 202, 208, 210 with code 612b xenon headlamp unit	GF82.10-P-2105A
	Table of contents, function description for exterior lighting		**GF82.10-P-0999A**

HEADLAMP CLEANING SYSTEM (HCS), LOCATION OF COMPONENTS - GF82.15-P-0002-03GH

F2k5	Relay 5
M5/2	HCS pump
N10/1	Extended activity module (EAM)
S4/1	HCS [SRA] switch

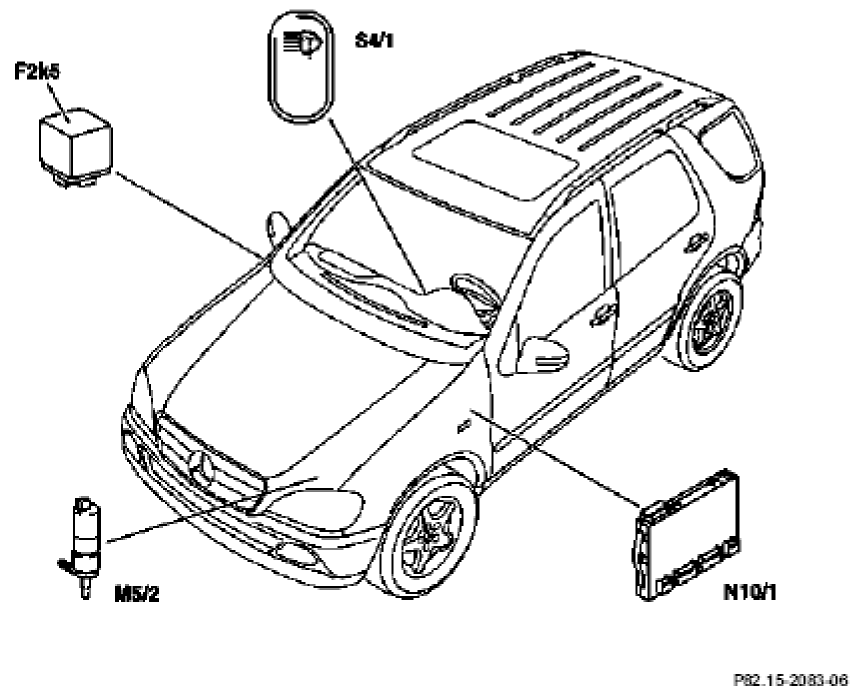


Fig. 12: Identifying Headlamp Cleaning System (HCS) Components Location

HEADLAMP CLEANING SYSTEM (HCS), FUNCTION - GF82.15-P-0002GH

MODEL 163 as of 01.09.01 with CODE (600a) headlamp cleaning system

Connection diagram

F2k5	Relay 5
M5/2	HCS pump
N10/1	Extended activity module (EAM)
S4/1	HCS [SRA] switch

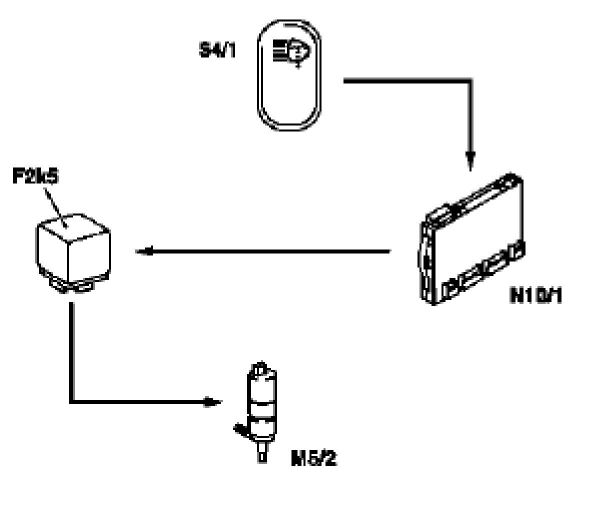


Fig. 13: Identifying Headlamp Cleaning System (HCS) Components Connection Diagram

Function prerequisites:

- Circuit 15 ON

Function

- The headlamp cleaning system is switched on by pressing the **SRA [HCS] switch (S4/1)** .
- The corresponding input of the **Extended Activity Module (EAM) (N10/1)** , which receives the input from the switch, sends the signal to **relay 5 (F2k5)** .
- The relay switches **circuit 30** , for a duty cycle of approx. 1 second, through to the **HCS pump (M5/2)** .
- The **HCS pump (M5/2)** builds up pressure in the washing water line.
- The water pressure acts against the return springs of the telescopic nozzles.
- The telescopic nozzles extend and spray washing water onto the headlamp glass.
- After the duty cycle, the pressure in the washing water line drops again and the telescopic nozzles move back to their starting position due to spring load.

i Pressing the **SRA [HCS] switch (S4/1)** again during an ongoing headlamp cleaning cycle has no effect.

A further cleaning cycle can only be initiated after the previous cycle has ended.

	Headlamp cleaning system (HCS), location of components		**GF82.15-P-0002-03GH**
	Telescopic nozzles for headlamp cleaning system, location/task/design/function		**GF82.15-P-2100GH**
	Extended Activity Module, location/task/design		**GF54.21-P-4107GK**

TABLE OF CONTENTS, FUNCTION DESCRIPTION FOR HEADLAMP CLEANING SYSTEM (HCS) - GF82.15-P-0998GHZ

MODEL 163 as of 01.09.01 with CODE (600a) headlamp cleaning system

	Headlamp cleaning system (HCS), function		**GF82.15-P-0002GH**
	Headlamp cleaning system (HCS), location of components		**GF82.15-P-0002-03GH**
	Survey of system components for headlamp cleaning system (HCS), location/task/design/function		**GF82.15-P-9998GHZ**

FUNCTION OF HEADLAMP CLEANING SYSTEM TELESCOPIC NOZZLES - GF82.15-P-2100-04GH

After the **HCS pump (M5/2)** has started to operate, pressure builds up in the washing water line for approx. 1

second. Driven by the water pressure, the nozzles first move telescopically into the cleaning position. Then as a result of a further pressure rise, a valve at each telescopic nozzle opens and an exactly metered quantity of washing water is sprayed onto the headlamp lenses.

Swirl chambers are provided at the tips of the telescoping sections and these ensure controlled propagation of the water jet, even when traveling fast. After the cleaning process, the telescoping sections are retracted back into the starting position with the aid of return springs.

TELESCOPIC NOZZLE FOR HEADLAMP CLEANING SYSTEM, LOCATION/TASK/ DESIGN/FUNCTION - GF82.15-P-2100GH

MODEL 163 as of 01.09.01 with CODE (600a) headlamp cleaning system

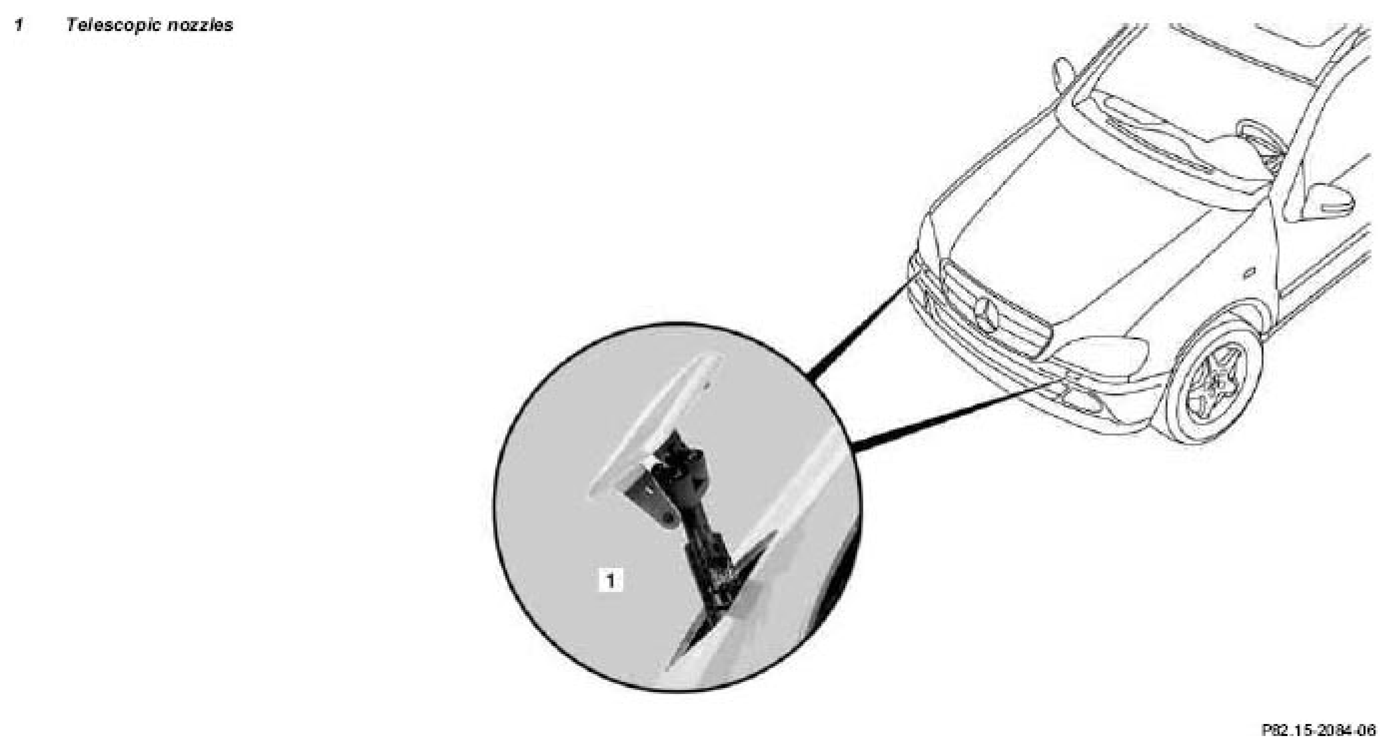


Fig. 14: Identifying Telescopic Nozzle Location For Headlamp Cleaning System

	Telescopic nozzle for headlamp cleaning system, location	The two telescopic nozzles are both arranged in the front bumper, under the headlamps.	
	Telescopic nozzle for headlamp cleaning system, design	The telescopic nozzle is a hydraulically extendable telescoping section with integrated return springs and has no electrical connection.	
	Telescopic nozzle for	Cleaning of headlamp	

	headlamp cleaning system, task	glass	
	Function of headlamp cleaning system telescopic nozzles		**GF82.15-P-2100-04GH**

SURVEY OF SYSTEM COMPONENTS FOR HEADLAMP CLEANING SYSTEM (HCS), LOCATION/TASK/DESIGN/FUNCTION - GF82.15-P-9998GHZ

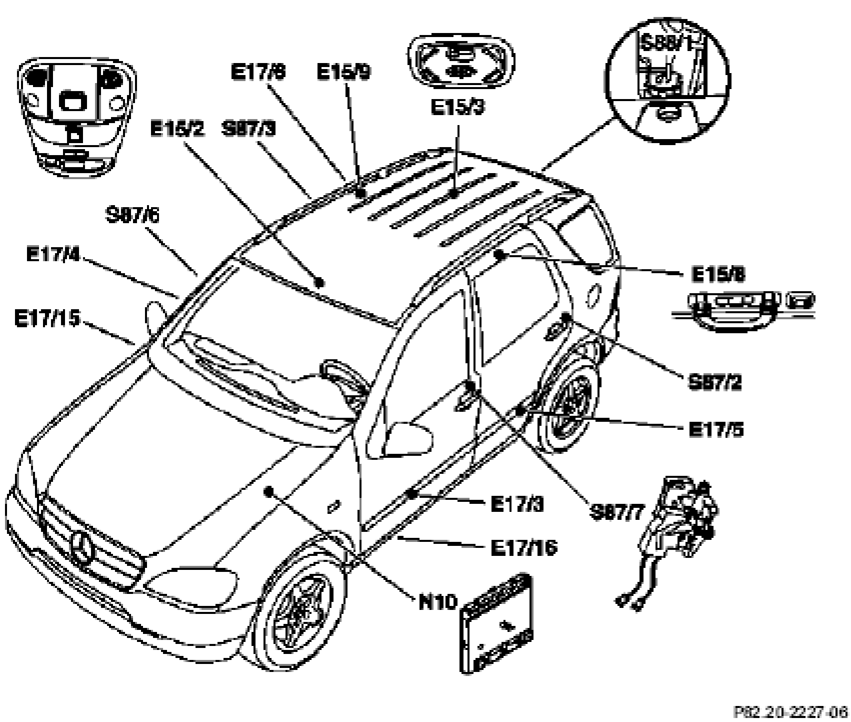
MODEL 163 as of 01.9.01 with CODE (600a) headlamp cleaning system

	Headlamp cleaning system (HCS), location of components		**GF82.15-P-0002-03GH**
	Telescopic nozzle for headlamp cleaning system, location/task/design/function		**GF82.15-P-2100GH**
	Table of contents, function description for headlamp cleaning system (HCS)		**GF82.15-P-0998GHZ**

INTERIOR LIGHTING (IL), LOCATION OF COMPONENTS - GF82.20-P-0002-01GH

Location of components

N10 *All-activity module (AAM)*
E15/2 *Front dome lamp with shut-off delay and front reading lamp*
E15/3 *Rear dome lamp*
E15/8 *Left rear dome lamp*
E15/9 *Right rear dome lamp*
E17/3 *Entrance and exit lamp in left front door (as of 12.99)*
E17/4 *Entrance and exit lamp in right front door (as of 12.99)*
E17/5 *Entrance and exit lamp in left rear door (as of 12.99)*
E17/6 *Entrance and exit lamp in right rear door (as of 12.99)*
E17/15 *Right front footwell lamp (as of 12.99)*
E17/16 *Left front footwell lamp (as of 12.99)*
S87/2 *Left rear door rotary tumbler microswitch*
S87/3 *Right rear door rotary tumbler microswitch*



S87/6 *Right front door rotary tumbler microswitch*
S87/7 *Left front door rotary tumbler microswitch*
S88/1 *Tailgate rotary tumbler microswitch*

Fig. 15: Identifying Interior Lighting (IL) Components Location

INTERIOR LIGHTING (IL), FUNCTION - GF82.20-P-0002GH

MODEL 163

The interior lighting can be switched on in two ways: **Manually** with

- the switches for the individual light

automatically by

- opening the doors
- Switching off the ignition
- Locking the vehicle with the central locking feature
- Following an accident

GF	Switching on interior lighting manually		**GF82.20-P-2009GH**
GF	Switching on interior lighting automatically		**GF82.20-P-2010GH**

CONTENTS - FUNCTION DESCRIPTION OF INTERIOR LIGHTING (IL) - GF82.20-P-0998GH

MODEL 163

	Interior lighting, location of components		**GF82.20-P-0002-01GH**
	Function description, interior lights		**GF82.20-P-0002GH**
	Switching interior lights on/off manually, function		**GF82.20-P-2009GH**
	Switching interior lights on/off automatically, function		**GF82.20-P-2010GH**
	Control of operating period of interior lights, function		**GF82.20-P-3001GH**
	Dimming interior lights, function		**GF82.20-P-3002GH**
	Actuating rear dome lamp, function		**GF82.20-P-4005GH**
	Actuating entrance/exit lamps, function	as of 12.99	**GF82.20-P-4004GH**
	Actuating footwell lamps, function	as of 12.99	**GF82.20-P-4008GH**
	Rotary tumbler		**GF82.20-P-4105GH**

	microswitches, location/purpose/ design/function		

SWITCHING INTERIOR LIGHTS ON/OFF MANUALLY, FUNCTION - GF82.20-P-2009GH

MODEL 163

The **front dome lamp (with shut-off delay and reading lamp) (E15/2)** , the **right rear dome lamp (E15/9)** and the **left rear dome lamp (E15/8)** can be switched manually to continuous operation. Each lamp is equipped with a switch which is actuated by pressing the lamp glass.

The actuated switch interrupts the automatic lamp actuation by the **all-activity module (AAM, N10)** and simultaneously switches the lamp connected to c. 30 to ground. Continuous operation can only be terminated by pressing the switch again. It is not possible to switch off the automatic lamp actuation.

i The **left front** and **right front footwell lamps (E17/16 and E17/15)** are switched on together with the **front dome lamp (E15/2)** The **rear interior lamp (E15/3)** can also be switched manually to continuous operation. Automatic lamp actuation is actuated directly when the tailgate is opened and not by the all-activity module. It is not possible to switch off automatic lamp actuation manually.

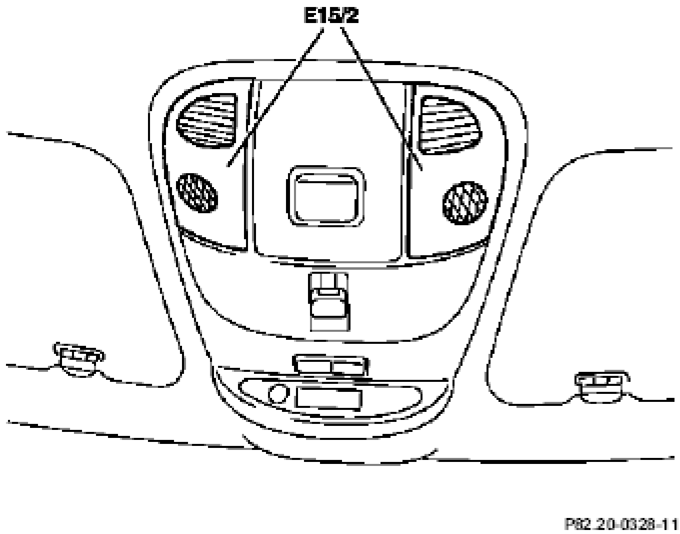


Fig. 16: Identifying Front Dome Lamp (With Shut-Off Delay And Reading Lamp)

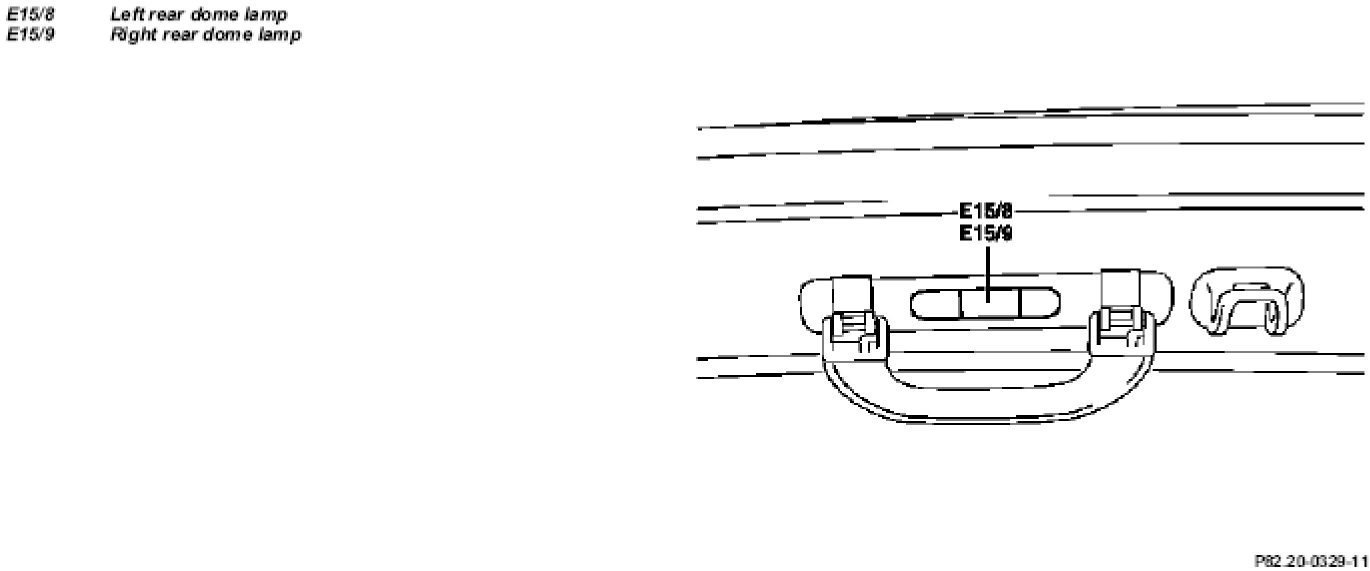


Fig. 17: Identifying Left Rear Dome Lamp And Right Rear Dome Lamp

	Actuating rear dome lamp		**GF82.20-P-4005GH**
	All-activity module (AAM)		**GF54.21-P-4100GH**

SWITCHING INTERIOR LIGHTS ON/OFF AUTOMATICALLY, FUNCTION - GF82.20-P-2010GH

MODEL 163

Automatic actuation of interior lights is triggered by

- opening a door,
- unlocking vehicle with transmitter key,
- switching off ignition within 30 seconds of switching off exterior lighting (terminal 58k)

or

- after crash recognition.

When opening a door, the respective **rotary tumbler microswitch (S87/2, S87/3, S87/6 or S87/7)** is actuated and a signal for automatic light actuation is sent to **All-Activity-Module (AAM, N10)**

With crash recognition by **ETR control module with airbag (ETR/ AB, N2/2)** up to 11.99 or by **restraint systems control module (N2/7)** as of 12/99, signal for automatic light actuation is sent to **All-Activity-Module** via a separate cable.

All-Activity-Module actuates corresponding interior lights dimmed and switches them off again, after expiry of

switched-on time.

i

- Lights switched on manually cannot be switched off by All-Activity-Module.
- **Rear interior lamp (E15/3)** is actuated directly by opening of rear door and not via All-Activity-Module.
- **Front and rear entrance and exit lamps (E17/3, E17/4, E17/5 and E17/6)** introduced as of 12/99 are actuated via the **Extended-Activity-Module (EAM)** when corresponding door is opened.

Following table shows which lights are switched on automatically, according to triggering.

Event	Dome lamp with delay and reading lamp, front	Footwell lamp, front left or right (as of 12.99)	Entrance/exit lamp, front left or right door (as of 12.99)	Dome lamp, front left	Dome lamp, rear right	Entrance/exit lamp, rear left or right door (as of 12.99)
Driver door or front passenger door opened	X	X	X			
Rear left door or rear right door opened				X	X	X
Central locking unlocked	X	X		X	X	
Ignition "Off"	X	X		X	X	
Crash recognition	X	X		X	X	

	Control of interior lighting switch-on time, function		**GF82.20-P-3001GH**
	Dimming interior lighting, function		**GF82.20-P-3002GH**
	Control of rear dome lamp, function		**GF82.20-P-4005GH**
	Rotary tumbler microswitch, location/purpose/design/function		**GF82.20-P-4105GH**
	Locking with transmitter key, function	Up to 11/99	**GF80.20-P-3005GH**
	Arrangement/purpose/design/function of All-Activity-Module (AAM)	Up to 11/99	**GF54.21-P-4100GH**
	Arrangement/purpose of Extended-Activity-Module		**GF54.21-P-4106GH**
	Supplemental restraint system (SRS), function	Up to 11/99	**GF91.60-P-**

		As of 12/99	0002GH GF91.60-P-0002GI

CONTROL OF OPERATING PERIOD OF INTERIOR LIGHTS, FUNCTION - GF82.20-P-3001GH

MODEL 163

The switch-on time for the interior lights is controlled by the **all-activity module (AAM) (N10)** . All lights are faded off.

- When the doors are open the corresponding lamps are switched off after 30 min.
- After closing the last front door or last rear door the corresponding lights are switched off after 10 s.
- After recognition of a crash the interior lights are switched back off after 30 min.
- When the ignition is switched on all of the lights are switched off immediately.

i

Lights switched on **manually** are not switched off by the AAM

GF	Switching off interior lights with face-off feature		GF82.20-P-3002GH
GF	Switching interior lights on/off manually, function		GF82.20-P-2009GH
GF	Switching interior lights on/off automatically, function		GF82.20-P-2010GH
GF	All-activity module (AAM)		GF54.21-P-4100GH

SWITCHING OFF INTERIOR LIGHTS WITH FADE-OFF FEATURE, FUNCTION - GF82.20-P-3002GH

MODEL 163

The interior lights are faded on and off by the **all-activity module (AAM) (N10)** . For this purpose the lamps are actuated by the AAM with a square wave voltage. The frequency of the square wave voltage is 122 Hz and remains constant. Only the on/off ratio of the square wave voltage is changed during fade on from 0 to 100 % within 2.5 s. When fading off the on/off ratio is reduced from 100 % to 0 % within 2.5 s.

GF	All-activity module (AAM)		GF54.21-P-4100GH

ACTUATING ENTRANCE/EXIT LAMPS, FUNCTION - GF82.20-P-4004GH

MODEL 163 as of 1.12.99

The **entrance and exit lamps in the front** and **rear doors (E17/3, E17/4, E17/5 and E17/6)** are actuated by the **extended activity module (EAM)** when the corresponding door is opened and when the **dome lamp** is switched on.

The switch-on time for the entrance/exit lamps corresponds to that of the interior lighting.

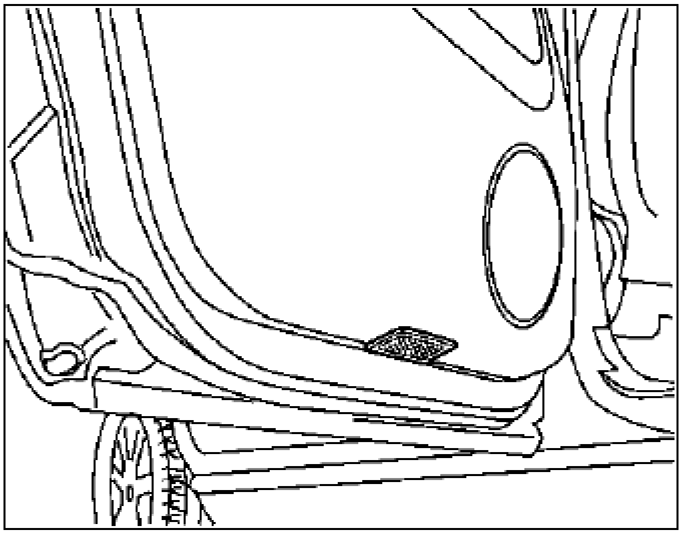


Fig. 18: Identifying Actuating Entrance/Exit Lamps

	Switching interior lighting on/off manually, function		**GF82.20-P-2009GH**
	Switching interior lighting on/off automatically, function		**GF82.20-P-2010GH**
	Extended activity module, location/purpose		**GF54.21-P-4106GH**

ACTUATING REAR DOME LAMP, FUNCTION - GF82.20-P-4005GH

MODEL 163

A slide switch with three positions is integrated into the **rear dome lamp (E15/3)** . The lamp is connected to circuit 30. Three modes can be selected with the slide switch:

- "Automatic" (1). The second lamp terminal is connected to the **rotary tumbler/tailgate microscwitch (S88/1)** which completes the circuit to circuit 31 when the tailgate is opened.
- Continuous "on" (2). The second terminal in the lamp is connected to circuit 31.
- Continuous "off" (3).

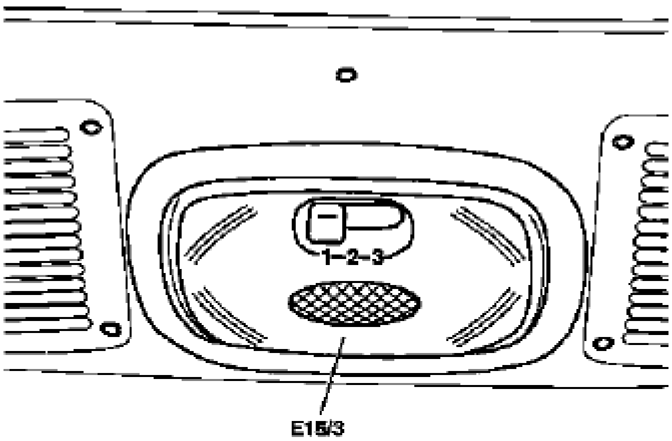


Fig. 19: Identifying Rear Dome Lamp

GF	Rotary tumbler microswitches		GF82.20-P-4105GH

ACTUATING FOOTWELL LAMPS, FUNCTION - GF82.20-P-4008GH

MODEL 163 as of 1.12.99

The **front left** and **right footwell lamps (E17/16 and E17/15) dome lamp (with shut-off delay and reading lamp) (E15/2)** automatically.

The switch-on time of the footwell lamps depends on the dome lamp.

are actuated each time the **front** is switched on manually or



Fig. 20: Identifying Actuating Footwell Lamp

	Switching interior lighting on/off manually,		GF82.20-P-2009GH

	function		
	Switching interior lighting on/off automatically, function		**GF82.20-P-2010GH**

ROTARY TUMBLER MICROSWITCHES, LOCATION - GF82.20-P-4105-01GH

The rotary tumbler microswitch is installed in the rotary tumbler.

Left rear rotary tumbler is shown

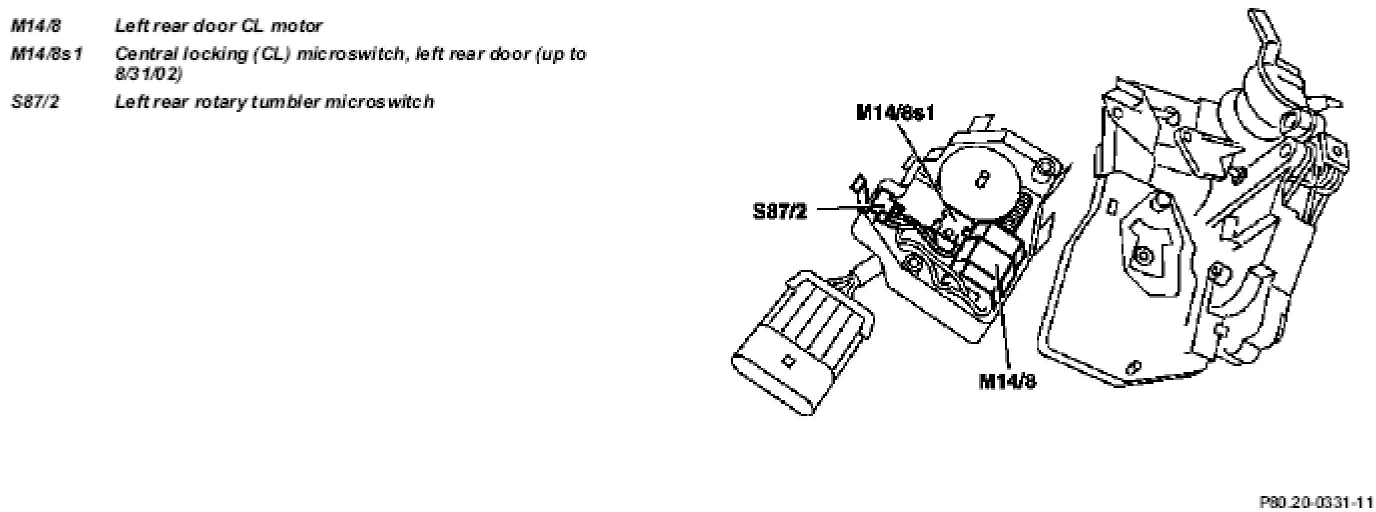


Fig. 21: Identifying Rotary Tumbler Microswitches, Location

ROTARY TUMBLER MICROSWITCHES, FUNCTION - GF82.20-P-4105-02GH

The contact in the left rear rotary tumbler microswitch (S87/2), the right rear rotary tumbler microswitch (S87/3), the right front door rotary tumbler microswitch (S87/6), the left front door rotary tumbler microswitch (S87/7) or the rear door rotary tumbler microswitch (S88/1) is closed when the respective door is closed (rotary tumbler snapped in place). The status of the switch contact is read by the All Activity Module (AAM)(N10).

i The central locking microswitches, which are also installed in the rotary tumbler, indicate whether a door is locked or unlocked. These microswitches are no longer used as of 31.08.02.

ROTARY TUMBLER MICROSWITCHES, LOCATION/TASK/DESIGN/FUNCTION - GF82.20-P-4105GH

MODEL 163

	Rotary tumbler microswitches, location		**GF82.20-P-4105-01GH**
	Rotary tumbler microswitches, task	Signal whether vehicle doors are closed/open to	

		AAM.	
	Rotary tumbler microswitches, design	The rotary tumbler microswitches are single-pole normally open contacts.	
	Rotary tumbler microswitches, function		**GF82.20-P-4105-02GH**

WIPER SYSTEM (WS), FUNCTION - GF82.30-P-0003GH

MODEL 163

Function

The windshield wiper system is operated with the **combination switch (S4)** .

The following functions can be selected with the switch:

- Actuating switch upward: **Wiping windshield** at slow (stage 1) or fast (stage 2) speed.
- Actuating switch downward: **Intermittent windshield wiping** (on vehicles with rain sensor (code 345a) this function is actuated by the rain sensor (B38).
- Actuating switch indirection of steering column: **Washing windshield**

The wiper system of the **rear window** is operated with the **wipe/wash rear window switch (S78)** . The following functions can be selected:

- **Intermittent rear window wiping** (on vehicles with rain sensor (code 345a) this function is actuated by the rain sensor (B38).
- **Washing** rear window

	Windshield wiper		**GF82.30-P-3004GH**
	Intermittent wiping on windshield		**GF82.30-P-3003GH**
	Windshield washer		**GF82.35-P-3002GH**
	Rear window washer		**GF82.35-P-3001GH**
	Intermittent wiping for rear window	up to 31.8.00 as of 1.9.00	**GF82.30-P-3001GH** **GF82.30-P-3001GK**
	Location of components, wiper system Windshield		**GF82.30-P-0005-01GH**
	Location of components, wiper system Rear window		**GF82.30-P-0004-01GH**
	All-activity module	up to 30.11.99	**GF54.21-P-4100GH**

		as of 1.12.99	GF54.21-P-4100GK

REAR WINDOW WIPER SYSTEM, LOCATION OF COMPONENTS - GF82.30-P-0004-01GH

Location of components

M5/3	Rear window washer pump
M6/4	Rear window wiper motor
N10	All-activity module (AAM)
S78	Rear window wiper/washer switch

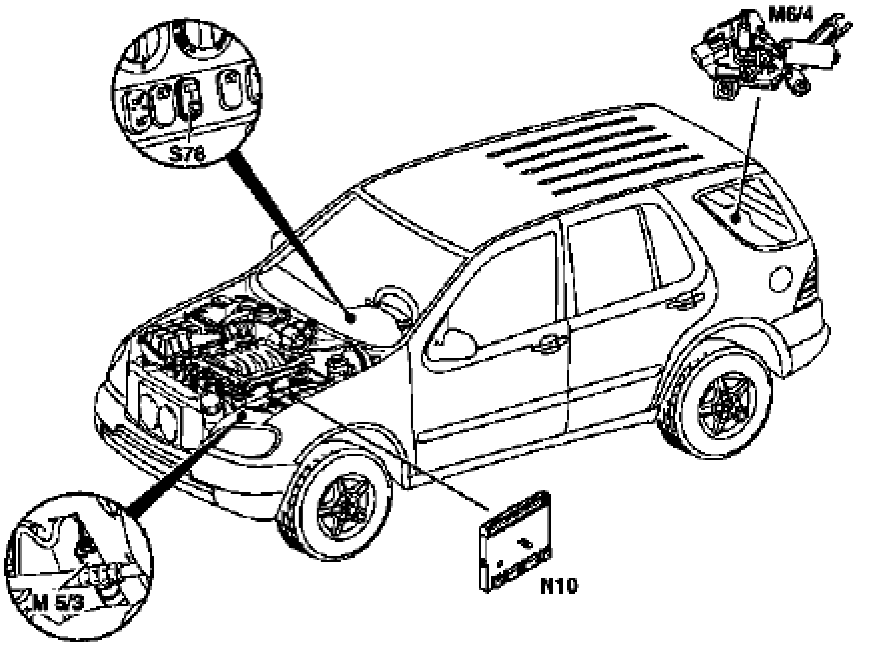


Fig. 22: Identifying Rear Window Wiper System Components Location

WINDSHIELD WIPER SYSTEM, LOCATION OF COMPONENTS - GF82.30-P-0005-01GH

Location of components

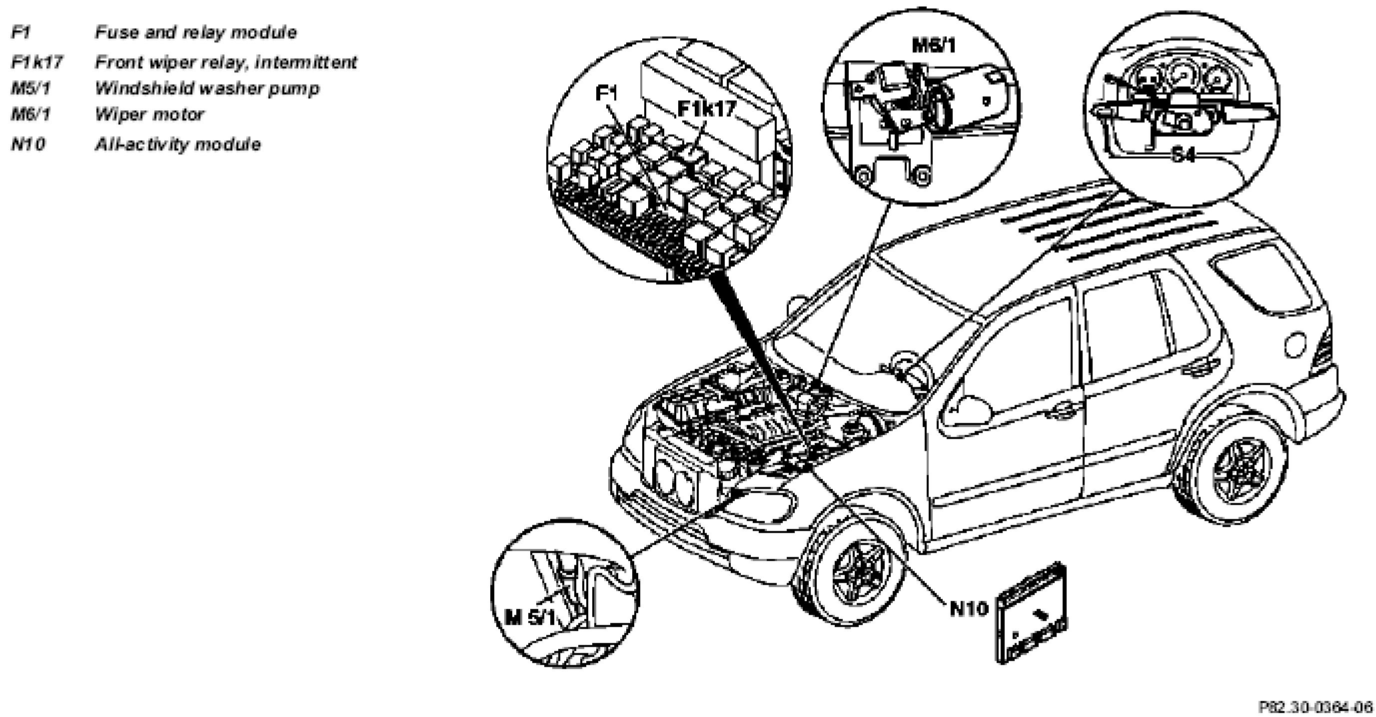


Fig. 23: Identifying Windshield Wiper System Components Location

i

As of 1.9.00 the vehicle is also offered with rain sensor (B38) code 344a. It is glued to the windshield.

CONTENTS - FUNCTION DESCRIPTION OF WIPER SYSTEM (WS) - GF82.30-P-0998GH

MODEL 163

	Wiper system, function		**GF82.30-P-0003GH**
	Rear window wiper system, location of components		**GF82.30-P-0004-01GH**
	Windshield wiper system, location of components		**GF82.30-P-0005-01GH**
	Intermittent wiping for rear window, function	up to 31.8.00 as of 1.9.00	**GF82.30-P-3001GH** **GF82.30-P-3001GK**
	Windshield intermittent wipe, function		**GF82.30-P-3003GH**
	Windshield wiper, function		**GF82.30-P-3004GH**
	Anti-block device for wiper motor, function		**GF82.30-P-4008GH**
	Rear window washer, function		**GF82.35-P-3001GH**
	Windshield washer, function		**GF82.35-P-3002GH**

	Survey on wiper system components (WS), location/ purpose/design/function		GF82.30-P-9998GH

REAR INTERMITTENT WIPE - FUNCTION - GF82.30-P-3001GH

MODEL 163 Applicable to 31.8.00

The rear intermittent wipe function is activated by placing the **rear wiper/washer switch (S78)** in the up position. With the switch in this position, the **All Activity Module (AAM) (N10)** activates the **tailgate wiper motor (M6/4)** every five seconds.

A relay circuit in the wiper motor stops the wiper arm in the park position.

	Rear wiper/washer switch		GF82.30-P-4105GH
	All Activity Module	To 30.11.99 As of 1.12.99	GF54.21-P-4100GH GF54.21-P-4100GK
	Tailgate wiper motor		GF82.30-P-4105GH

REAR INTERMITTENT WIPE - FUNCTION - GF82.30-P-3001GK

MODEL 163 Applicable as of 1.9.00

The rear intermittent wipe function is linked, among other things, to the operation of the windshield wiper system. It will therefore be described in relation to the position of the combination switch (S4):

Combination switch (S4) position: OFF

The **rear wiper** is powered **from KI. 15R: ON** by operating the **rear wiper/washer switch (S78)** . Switching on the wiper illuminates the **LED** on the rear wiper/washer switch (S78) and **immediately** causes the wiper arm to perform one complete sweep before switching to intermittent wiping.

When the vehicle is traveling at speeds of

- **less than 100 km/h** the wipe interval is **10 seconds**
- **of 100 km/h or more** the wipe interval is **5 seconds** .

The wiper is turned off by reactivating the wiper/washer switch.

Combination switch (S4) position: Wiper speed 1 or 2

- The **rear wiper** is activated from **KI. 15R: ON** using the **rear wiper/washer switch (S78)** .

  Switching on the wiper illuminates the **LED** on the rear wiper/ washer switch (S78) and **immediately** causes the wiper arm to perform one complete sweep before switching to intermittent wiping. The wipe interval is **5 seconds** .

The wiper is turned off by reactivating the wiper/washer switch.

- The **rear wiper** switches on **automatically from KI. 15R: ON** when reverse gear is engaged. The wiper operates continuously **without** delays until reverse gear is disengaged. Note: The **LED** on the rear wiper/washer switch (S78) does **not** illuminate when vehicle is in reverse gear.

Combination switch (S4) position: Intermittent

When the **combination switch (S4) is in the Intermittent position** we must differentiate between vehicles with and without **rain sensors** (code 345a) when describing the rear wiper function.

No rain sensor (no code 345a)

The rear intermittent wipe function is activated as follows:

- By engaging **reverse gear** ; from **KI. 15: ON** . The wiper arm immediately performs one complete sweep.

  Then the rear wiper switches to intermittent wiping at a **frequency half that of the front windshield wiper** until the vehicle is put into neutral or another gear.

  NOTE: The *LED* on the rear wiper/washer switch (S78) does not illuminate when the vehicle is in reverse gear.

- By **activating the rear wiper/washer switch (S78)** ; from **KI. 15R: ON** . Switching on the wiper illuminates the **LED** on the rear wiper/washer switch (S78) and **immediately** causes the wiper arm to perform one complete sweep. Then the rear wiper switches to intermittent wiping at a **frequency half that of the front windshield wiper. The wiper is turned off by reactivating the wiper/washer switch** .

The start of each wipe cycle is synchronized with the front wiper system.

With rain sensor (with code 345a)

The rear intermittent wipe function is activated as follows:

- By engaging **reverse gear** ; from **KI. 15: ON** . The wiper arm immediately performs one complete sweep. Then the rear wiper switches to intermittent wiping at a **frequency equal to that of the front windshield wiper** until the vehicle is put into neutral or another gear.

  NOTE: The *LED* on the rear wiper/washer switch (S78) does *not* illuminate when the vehicle is in reverse gear.

- By **activating the rear wiper/washer switch (S78)** ; from **KI. 15:** ON. Switching on the wiper illuminates the **LED** on the rear wiper/washer switch (S78) and immediately causes the wiper arm to perform one complete sweep before switching to intermittent wiping. The frequency is linked to the frequency of the front windshield wiper and is thus controlled by the **rain (B38)sensor** .

The actual frequency is also a factor of the vehicle's speed of travel (see chart below).

The wiper is turned off by reactivating the wiper/washer switch.

The start of each wipe cycle is synchronized with the front wiper system.

	Vehicle speed Under 50 km/h	Vehicle speed 50 to 100 km/h	Vehicle speed 100 km/h and higher
Frequency of Rear wiper	One **twelfth** of front wiper frequency	One **tenth** of front wiper frequency	One **sixth** of front wiper frequency

Networking

Rain sensor (B38) and reverse signals are fed to the **All Activity Module (AAM) (N10)** via the **engine compartment CAN.**

The settings of the **rear wiper/washer switch (S78)** are read directly by the **All Activity Module (AAM) (N10)** .

The **tailgate wiper motor unit (M6/4)** is controlled directly by the **All Activity Module (AAM, N10)** .

i The **tailgate wiper motor unit (M6/4)** comprises a **relay** and a **cam-operated switch** in addition to the actual motor.

	Rear Wiper/Washer Switch - Location/Task/ Design/Function		**GF82.30-P-4105GH**
	All Activity Module - Location/Task/Design/ Function		**GF54.21-P-4100GK**
	Tailgate Wiper Motor - Location/Task/Design/ Function		**GF82.30-P-4105GH**
	Rain Sensor - Location/Task/Design/Function	Vehicles with code 345a (rain sensor) only	**GF82.30-P-4103GH**

WINDSHIELD INTERMITTENT WIPE, FUNCTION - GF82.30-P-3003GH

MODEL 163

Function sequence

The interval wiping function is switched on to position (i) with the combination switch.

The input (pin A8) of the **all-activity module (AAM, N10)** is connected to c. 15 **R** .

The AAM immediately actuates the **front wiper motor relay (F1k17)** for max. 2 s. In wiper stage 1 power is supplied to the **wiper motor (M6/1)** by the relay (pin a).

Power is supplied to the motor by the cam switch and non-actuated contact of the relay **F1 k17** (pin b) until the wiper arm has reached its park position. When the park position is reached the cam switch switches over. Then the two motor connectors are short-circuited and the motor is braked by the eddy-currents.

Then the actual interval wiping starts. The described procedure is repeated for each interval.

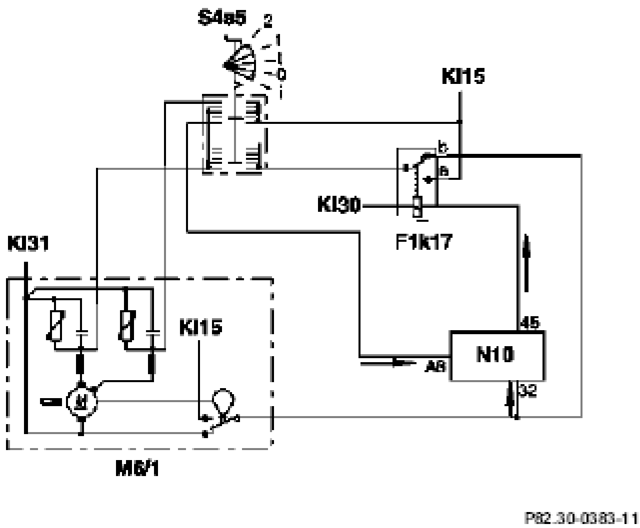


Fig. 24: Identifying Windshield Intermittent Wipe Function

Interval actuation without code 345a (without rain sensor)

When the **interval time** is completed the AAM starts a new wiping procedure. The interval time is speed dependent and is adjusted between 5 s when parked and 1 s at a speed of 180 km/h by the AAM.

Interval actuation as of 1.9.00 with code 345a (with rain sensor)

When **c. 1 is ON:** the **rain sensor (B38) defines the wiping intervals** .

The **wiper motor relay (F1 k17)** is actuated by the AAM at the intervals defined by the rain sensor (cf. function sequence above). The relay switches off when c. 31 b (wiper not in park position) is recognized, however, after 1 s (lock-up) at the latest.

In the event of heavy rain the relay remains actuated, the wiper operates as in stage 1.

	Wiper motor, location/purpose/design/function		**GF82.30-P-4104GH**
	Safety switch-off (WS), function	as of 1.9.2000	**GF82.30-P-3005GH**
	Anti-lock protection for wiper motor		**GF82.30-P-4008GH**
	All-activity module (AAM), location/purpose/ design/function	up to 30.11.99	**GF54.21-P-4100GH**

		as of 1.12.99	**GF54.21-P-4100GK**
	Rain sensor	only with code 345a (rain sensor)	**GF82.30-P-4103GH**

WIPER, FUNCTION - GF82.30-P-3004GH

MODEL 163

The function wiping windshield is switched in three stages with the **combination switch (S4)**

- **One-touch wiping - press** switch lever upward to first catch position (t). The switch lever returns to the basic position after being released.
- **Wiping stage 1** - press switch lever upward beyond first catch position (1).
- **Wiping stage 2** - press switch lever upward beyond second catch point (2).

A connector of the **wiper motor (M6/1)** is connected to circuit 15. The motor starts operating. When stage 2 is switched on the other motor connection is switched. The motor operates with higher speed.

When switched back to the basic setting the motor is supplied with power by c. 15 via the non-actuated contact of relay **F1k17** (b) until the wiper arm has reached its park position. In this position, the cam switch brakes the motor by short-circuiting (eddy-current brake)

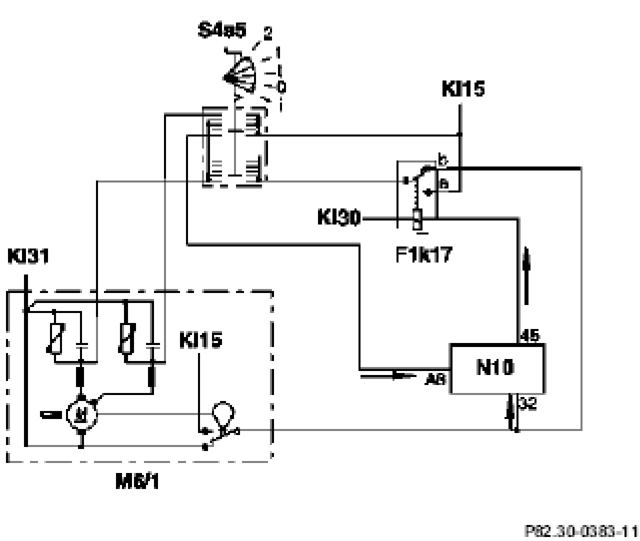


Fig. 25: Identifying Wiper Function

	Anti-lock protection for wiper motor		**GF82.30-P-4008GH**
	Wiper motor, location/purpose/design/function		**GF82.30-P-4104GH**
	All-activity module,	up to 30.11.99	**GF54.21-P-**

	location/purpose/design/function	as of 1.12.99	**4100GH** **GF54.21-P-4100GK**
	Extended activity module, location/purpose	as of 1.12.99	**GF54.21-P-4106GH**

SAFETY SHUTOFF (WSA) - FUNCTION - GF82.30-P-3005GH

MODEL 163 Applicable as of 1.9.00

Safety shutoff

The **intermittent wipe** function is interrupted when the vehicle comes to a **complete stop** and at least one of the front doors is open. Any wipe cycle in progress is completed before wipers come to a halt.

Wiping resumes when both front doors are closed and/or the vehicle is put into motion.

i The safety shutoff therefore only operates when the vehicle is at a complete stop. This ensures that the intermittent wiping feature remains available during driving even if a door jamb switch is defective.

	Windshield Intermittent Wipe - Function		**GF82.30-P-3003GH**

ANTI-LOCK PROTECTION FOR WIPER MOTOR, FUNCTION - GF82.30-P-4008GH

MODEL 163

The **all-activity module(AAM) (N10)** recognizes that the **wiper motor (M6/1)** is locked up because of the absence of signals from the cam switch.

If signals are not recognized for longer than 1 s the **front wiper motor relay (F1k17)** is no longer actuated.

i

The anti-lock protection is only effective in the function **interval wiping** . In other wiper stages the AAM does not have influence on the wiper motor.

	Wiper motor, location/purpose/design/function		**GF82.30-P-4104GH**
	All-activity module (AAM), location/purpose/ design/function	up to 30.11.99 as of 1.12.99	**GF54.21-P-4100GH** **GF54.21-P-4100GK**

RAIN SENSOR - FUNCTION - GF82.30-P-4103-02GH

How it works

An infrared transmitter (2)sends infrared light to a lens (1) which directs the beam to the windshield (4) . The intensity of the light reflected by the windshield is measured by an IR receiver (3)located at the opposite end of the lens.

- **Dry windshield (Fig. A)**

  When the area around the **rain sensor (B38)** is dry nearly all of the light is reflected and the IR receiver (3) measures a **high level** of light intensity.

- **Wet windshield (Fig. B)**

  When the reflection area is wet, some of the light is scattered away from the glass of the windshield. This reduces the intensity of the reflected light and the IR receiver (3) measures a **lower level** of light intensity.

The light intensity measured by the IR receiver (3) provides a measure of the rain intensity on the windshield. **Lower** light intensities indicate **higher** levels of **rain intensity** on the windshield.

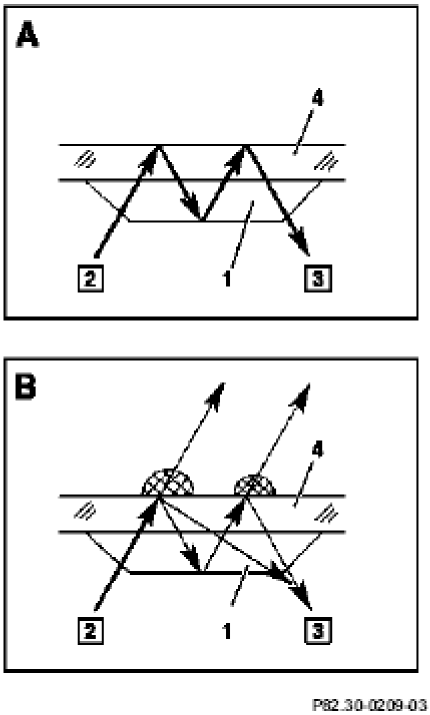


Fig. 26: Identifying Infrared Transmitter And IR Receiver

Rain sensor data flow

The rain sensor (B38) networks with the **All Activity Module (AAM, N10)** via the engine compartment CAN.

i More than just a "rain sensor," the unit also comprises integrated **light sensors** for the **vehicle lighting**

system . Data from the light sensors is also sent to the **All Activity Module (AAM, N10)** via the engine compartment CAN.

Power supply

Power is supplied to the rain sensor (B38) via KI. 15 so that these functions are available only when the ignition is on.

RAIN SENSOR - LOCATION/TASK/DESIGN/FUNCTION - GF82.30-P-4103GH

MODEL 163 with code 345a Rain sensor

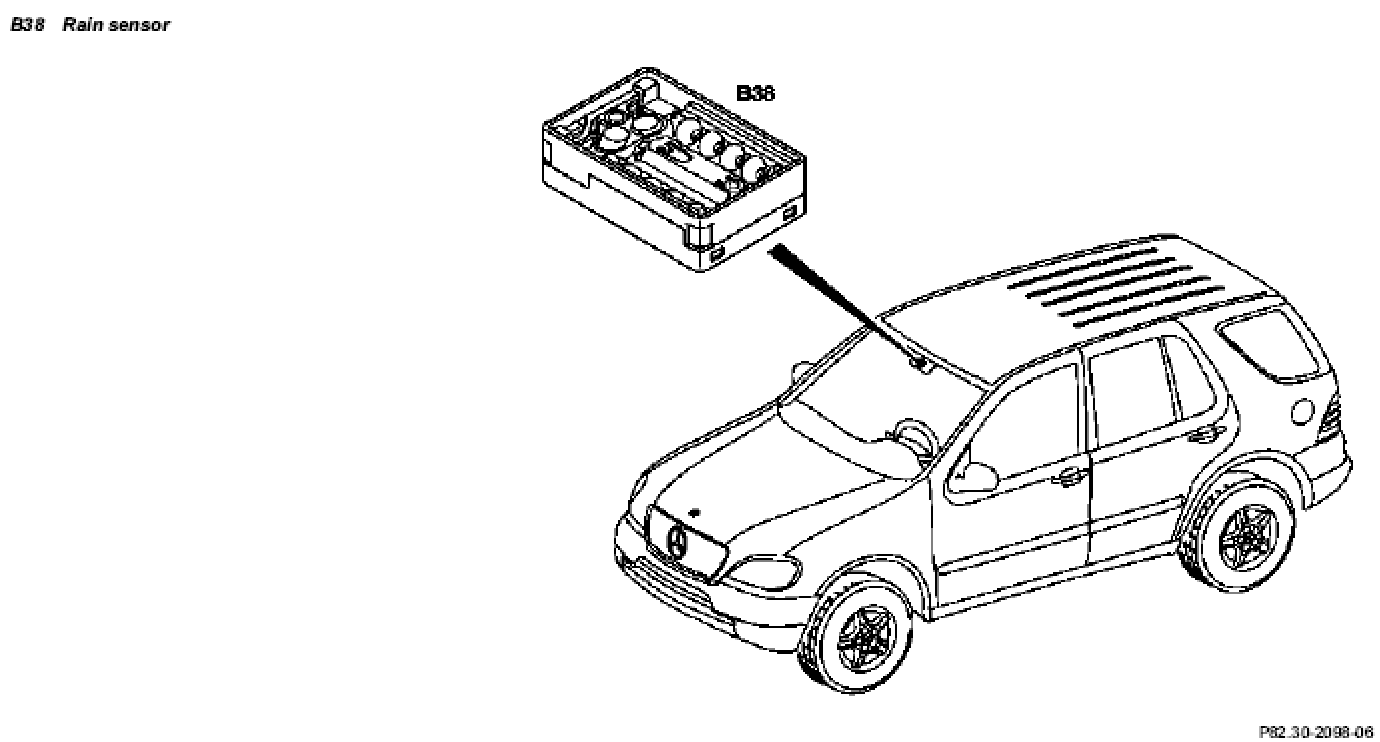


Fig. 27: Identifying Rain Sensor Location

	Rain Sensor - Location	The rain sensor (B38) is adhered to the inside surface of the windshield.	
	Rain Sensor - Task	The rain sensor (B38) assesses **the rain intensity** on the windshield and automatically adjusts the intermittent wiper speed. In addition, light sensors **gauge ambient light**	

		conditions and this data is used to control the vehicle's light system.	
	Rain Sensor - Design	The rain sensor (B38) comprises an **IR transmitter and receiver unit, light sensors** and an electronic data analysis and interface circuit. The rain sensor (B38) is connected to the **engine compartment CAN** .	
	Rain Sensor - Function		**GF82.30-P-4103-02GH**

WIPER MOTOR, FUNCTION - GF82.30-P-4104-01GH

The wiper arm can be driven by the motor with two speeds. The motor runs at high or low speed depending on brush voltage present.

The cam switch switches circuit 31b from circuit 15 to circuit 31 when the windshield wiper runs through the park position.

WIPER MOTOR, DESIGN - GF82.30-P-4104-02GH

The windshield wiper is driven by the **wiper motor (M6/1)** , an electric motor with three brushes and gear. The cam switch is located on the output shaft.

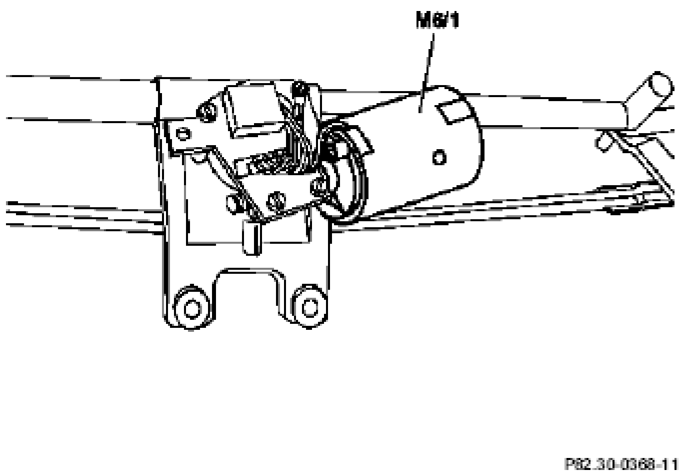


Fig. 28: Identifying Wiper Motor

WIPER MOTOR, LOCATION/PURPOSE/DESIGN/FUNCTION - GF82.30-P-4104GH

MODEL 163

	Wiper motor, location		**GF82.30-P-0005-01GH**
	Wiper motor, purpose	Wiper motor drive for windshield.	
	Wiper motor, design		**GF82.30-P-4104-02GH**
	Wiper motor, function		**GF82.30-P-4104-01GH**

REAR WIPER/WASHER SWITCH - FUNCTION - GF82.30-P-4105-01GH

The rear intermittent wipe function is started by placing the rear wiper/washer switch (S78) in the up position. The switching contact connects the input (c) to the **All Activity Module (AAM, N10)** to terminal 15 (a).

The rear wash function is started by placing the switch in the down position. Power is fed to the **tailgate washer pump (M5/3)** (b) from terminal 15 via the second switch contact and the AAM input (c) is simultaneously connected to terminal 15 via the resistor (R).

As of 1.9.2000:

When the rear intermittent wipe function is activated **manually** the LED built into the rear wiper/ washer switch (S78) will illuminate. LED illumination is controlled by the **All Activity Module (AAM, N10)** .

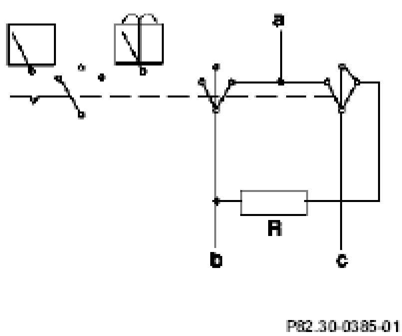


Fig. 29: Identifying Rear Wiper/Washer Switch Function

REAR WIPER/WASHER SWITCH - LOCATION/TASK/DESIGN/FUNCTION - GF82.30-P-4105GH

MODEL 163

	Location		**GF82.30-P-0004-01GH**
	Task	To control the rear intermittent wipe and rear wash functions Starting 1.9.2000 this switch will also include an ON/OFF indicator LED for the rear wiper.	
	Design	The rear wiper switch consists of a push-button	

		with two normally open contacts. An LED indicator will be added starting 1.9.2000.	
	Function		**GF82.30-P-4105-01GH**

REAR WINDOW WIPER MOTOR, FUNCTION - GF82.30-P-4106-01GH

The **rear window wiper motor (M6/4)** is controlled by the **all-activity module (AAM) (N10) Wiper operation** :

The rear window wiper is in the non-actuated position and the cam switch is therefore actuated. The relay is actuated by the AAM. The **rear window wiper motor (M6/4)** starts running . The cam switch is released. The motor then continues to run even when the relay is no longer actuated. Upon reaching the park position the cam switch is actuated. If the relay is no longer actuated the motor is stopped by short circuiting through a coil.

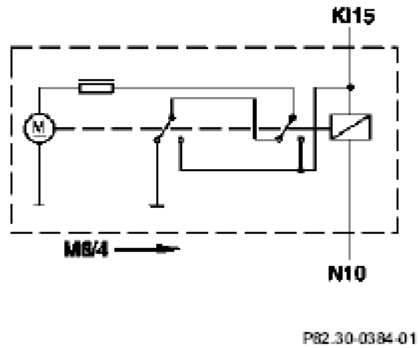


Fig. 30: Identifying Rear Window Wiper Motor Function

REAR WINDOW WIPER MOTOR, DESIGN - GF82.30-P-4106-02GH

The rear window wiper is driven by the **rear window wiper motor (M6/4)** with a cam switch (1) on the output shaft. A temperature switch serves for overload protection.

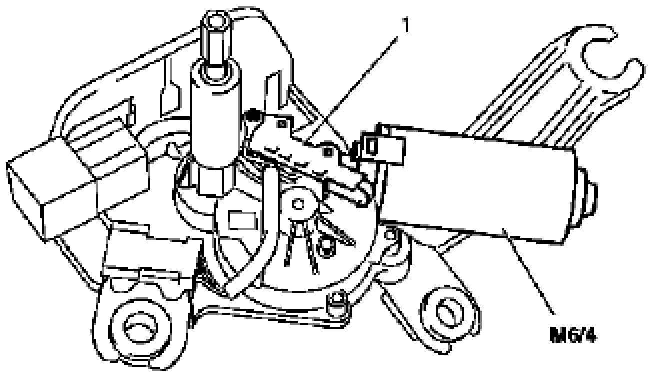


Fig. 31: Identifying Rear Window Wiper Motor And Cam Switch

REAR WINDOW WIPER MOTOR, LOCATION/PURPOSE/DESIGN/FUNCTION - GF82.30-P-4106GH

MODEL 163

GF	Location		GF82.30-P-0004-01GH
	Purpose	Driving rear window wiper.	
	Design		GF82.30-P-4106-02GH
GF	Function		GF82.30-P-4106-01GH

SURVEY OF SYSTEM COMPONENTS WIPER SYSTEM (WS), LOCATION/ PURPOSE/DESIGN/FUNCTION - GF82.30-P-9998GH

MODEL 163

	Wiper motor, location / purpose / design / function		GF82.30-P-4104GH
	Rear window wiper / washer switch, location / purpose / design / function		GF82.30-P-4105GH
	Rear window wiper motor, location / purpose / design / function		GF82.30-P-4106GH
	Washer pump, location / purpose / design / function		GF82.35-P-4101A

	Rear window washer pump, location / purpose / design / function		**GF82.35-P-4103GH**
	Table of contents, function description, wiper system (WS)		**GF82.30-P-0998GH**

REAR WASH - FUNCTION - GF82.35-P-3001GH

MODEL 163

The rear wash function is activated by placing the **rear wiper/ washer switch (S78)** in the down position. The switch contact connects the **tailgate washer pump (M5/3)** to terminal 15. The **All Activity Module (AAM) (N10)** detects the activation of the switch via the second switch contact and actuates the **tailgate washer motor (M6/4)** and the **tailgate washer fluid pump (M5/3)** for as long as the switch is on.

The activation time for the **tailgate washer fluid pump (M5/3)** is limited to 15 sec. To reactivate the pump, the button must be pressed again.

To wipe window dry, the **tailgate wiper motor (M6/4)** remains activated for five seconds after the switch is released.

i

As described for the rear wiper function, a relay circuit in the wiper motor stops the wiper in the park position .

	Rear Wipe		**GF82.30-P-3004GH**
	Rear Wiper/Washer Switch		**GF82.30-P-4105GH**
	Tailgate Wiper Motor		**GF82.30-P-4106GH**
	Tailgate Washer Pump		**GF82.35-P-4103GH**
	All Activity Module	To 30.11.99 As of 1.12.99	**GF54.21-P-4100GH** **GF54.21-P-4100GK**

WINDSHIELD WASH - FUNCTION - GF82.35-P-3002GH

MODEL 163

The windshield wash function is activated by pulling the **combination switch, washer switch (S4s4)** towards the steering column. The switch contact connects the **washer pump (M5/1)** to terminal 15R. The **All Activity Module (AAM) (N10)** detects switch activation via an input that measures power supply to the washer pump (M5/1).

If the **combination switch (S4)** is in the Wiper Off or Intermittent position, the AAM activates the **wiper motor (M6/1)** via relay **F1k17** . To wipe windshield dry, the motor continues to operate after the switch has

been released until the AAM detects three operations of the cam-operated switch.

	Windshield Intermittent Wipe - Function		**GF82.30-P-3003GH**
	Windshield Washer Pump		**GF82.35-P-4101A**
	Wiper Motor		**GF82.30-P-4104GH**
	All Activity Module	To 30.11.99 As of 1.12.99	**GF54.21-P-4100GH** **GF54.21-P-4100GK**

WASHER PUMP, FUNCTION - GF82.35-P-4101-01GH

The motor for the **washer pump (M5/1)** is switched on and off by the **single wipe/wash switch (S4s4)** in the combination switch.

The pump pumps water from the washer water reservoir to the windshield washer.

WINDSHIELD WASHER PUMP, LOCATION/PURPOSE/DESIGN/FUNCTION - GF82.35-P-4101A

MODEL 202 as of 1.6.97, 208, 163, 210.081, 210 (except 210.2 /081) as of 1.3.97

GF	Location	Models 202, 208, 210 Model 163	GF82.30-P-0005-01A **GF82.35-P-4103-01GH**
	Purpose	Pumping water for washing windshield	
	Design	The windshield washer pump is driven by a DC motor	
GF	Function	Models 202, 208, 210 Model 163	GF82.35-P-4101-01A **GF82.35-P-4101-01GH**

REAR WINDOW WASHER PUMP, LOCATION - GF82.35-P-4103-01GH

M5/1	*Washer pump*
M5/3	*Rear window washer pump*

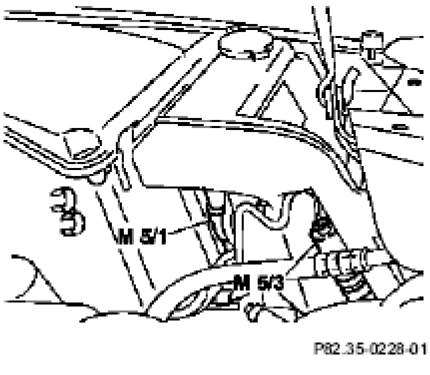


Fig. 32: Identifying Washer Pump And Rear Window Washer Pump

REAR WINDOW WASHER PUMP, FUNCTION - GF82.35-P-4103-02GH

The motor for the **rear window washer pump (M5/3)** is switched on and off by the **rear window wiper/washer switch (S78)** .

The pump pumps water from the washer water reservoir to the rear window washer.

REAR WINDOW WASHER PUMP, LOCATION/PURPOSE/DESIGN/FUNCTION - GF82.35-P-4103GH

MODEL 163

GF	Location		GF82.35-P-4103-01GH
	Purpose	Pumping water for washing rear window.	
	Design	The washer pump is driven by a DC motor	
GF	Function		GF82.35-P-4103-02GH

RADIO (RD), LOCATION OF CONTROLS - GF82.60-P-0001-02I

MB Hi-line radio (USA)

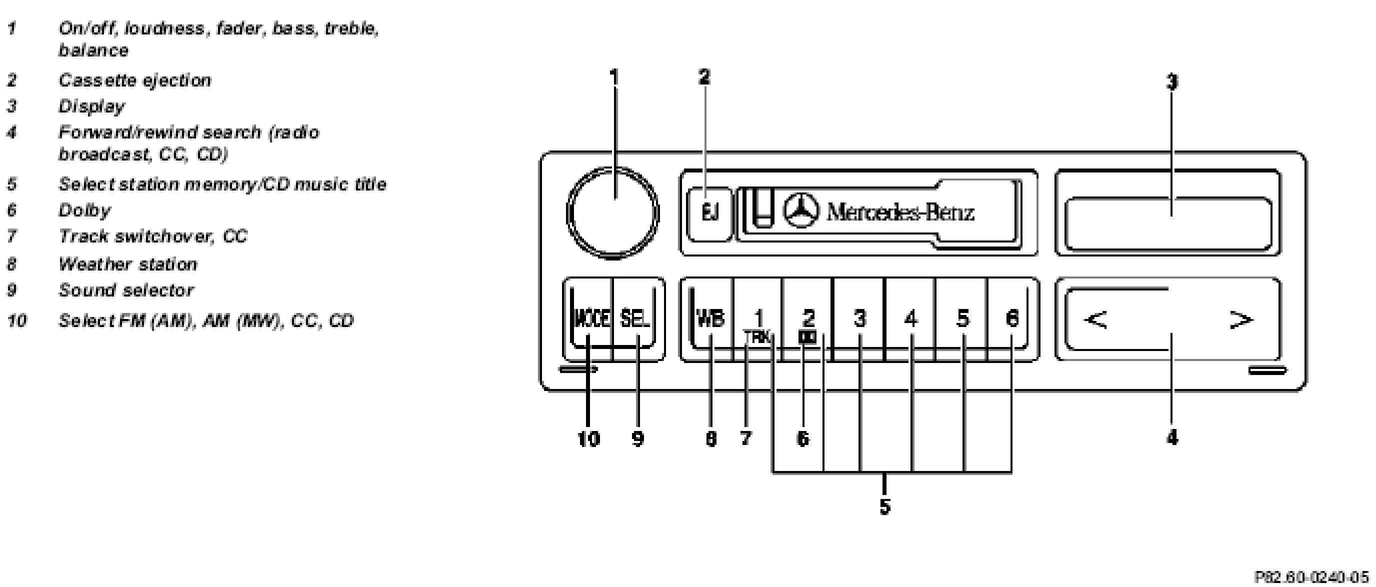
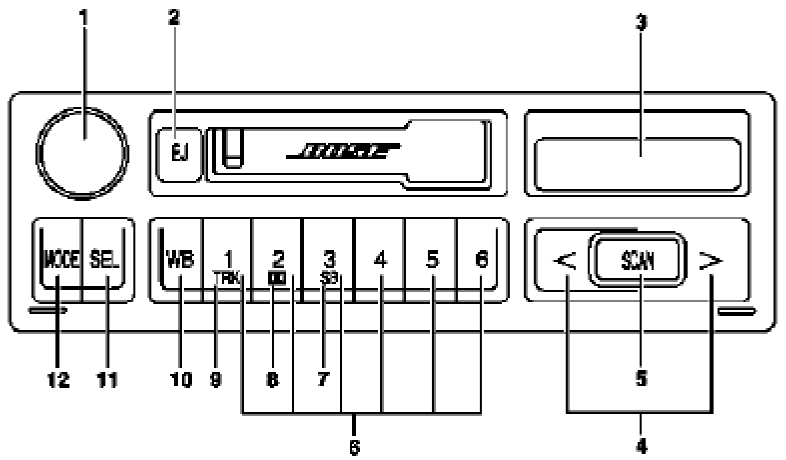


Fig. 33: Identifying Radio (RD) Controls Location

RADIO (RD), LOCATION OF CONTROLS - GF82.60-P-0001-02J

MB Premium radio (USA)

1. On/off, loudness, fader, bass, treble, balance
2. Cassette ejection
3. Display
4. Forward/rewind search (radio broadcast, CC, CD)
5. Scan search (radio broadcast, CC, CD)
6. Select station memory/CD music title
7. Skip blank, CC
8. Dolby
9. Track switchover, CC
10. Weather station
11. Sound selector
12. Select FM 1/2 (AM 1/2), AM (MW), CC, CD



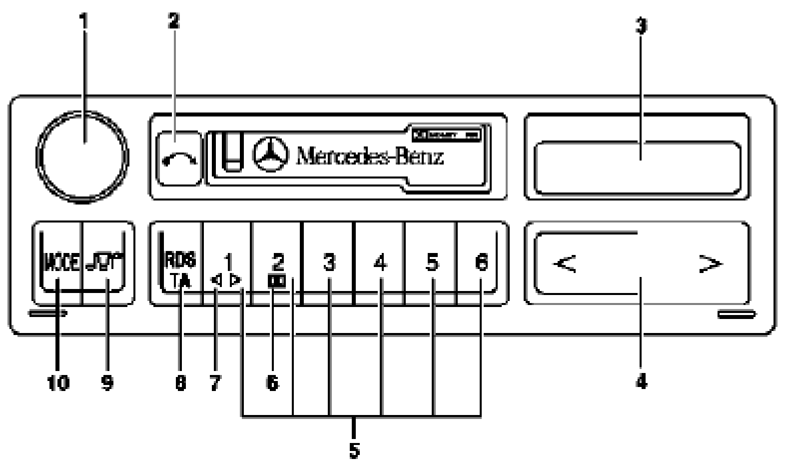
P82.60-0241-05

Fig. 34: Identifying Radio (RD) Controls Location

RADIO (RD) ARRANGEMENT OF OPERATING ELEMENTS - GF82.60-P-0001-02K

MB radio ML 5

1. On/off, loudness, fader, bass, treble, balance
2. Cassette ejection
3. Display
4. Forward/rewind search (radio broadcast, CC, CD)
5. Select station memory/CD music title
6. Dolby
7. Track switchover, CC
8. RDS/TA
9. Sound selector
10. Select FM (VHF), AM (MW), CC, CD



P82.60-0261-05

Fig. 35: Identifying Radio (RD) Arrangement Of Operating Elements

RADIO (RD) ARRANGEMENT OF OPERATING ELEMENTS - GF82.60-P-0001-02L

MB ML 10 radio

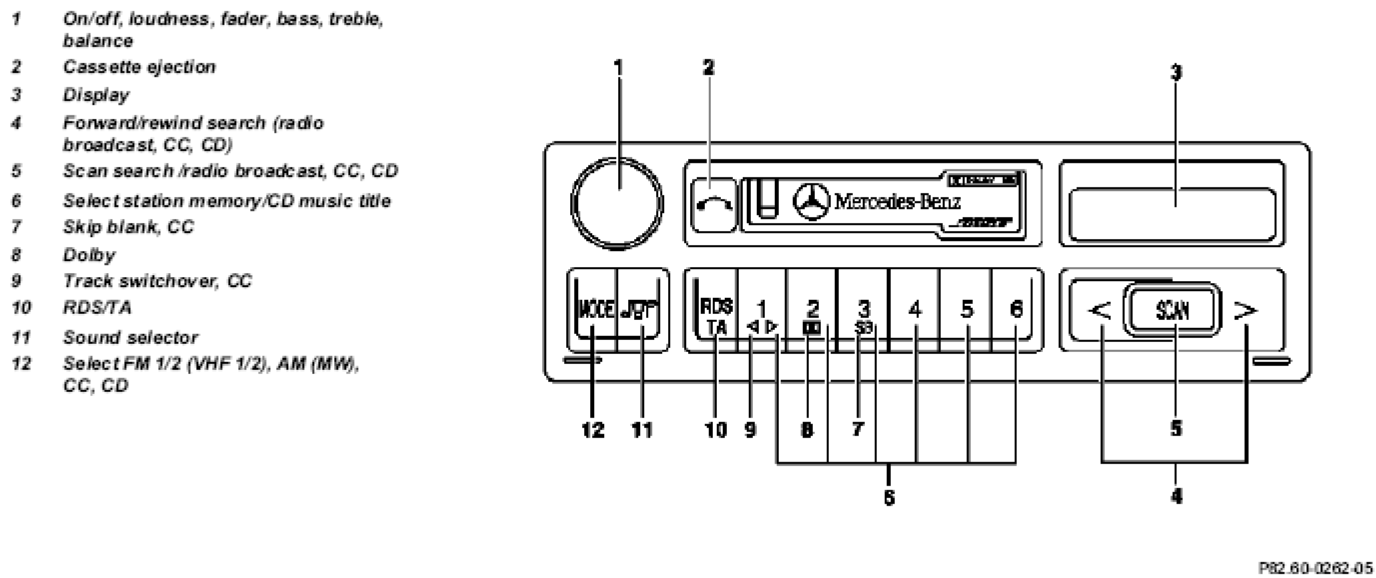


Fig. 36: Identifying Radio (RD) Arrangement Of Operating Elements

RADIO MODE, FUNCTION - GF82.60-P-2001B

MODELS 163, 168, 170, 203.0 /2 /7, 208, 209.3 /4, 210 with CODE (353) Audio 30 APS

The ultra-short wave (FM), medium wave (MW) and long wave (LW) high-frequency signals are received from the radio antenna mounted on the vehicle. The music, voice and/or data signals are modulated upon the high-frequency signals received. The high-frequency signals are forwarded by the radio antenna over a coaxial cable to the radio receiver in the radio and navigation unit (A2/56). The radio receiver demodulates the high-frequency signals, i.e. it separates the useful information from the high-frequency carrier signal. The demodulated audio signals are amplified and converted to sound signals by the vehicle speakers. Possibilities for radio station selection:

- Direct frequency input
- Manual station search
- Automatic station search (the stations on a waveband are played for approx. 8 s)
- Station selection from the memory (6 stations for each frequency range)

Radio Data System (RDS), function

Many radio stations, e.g. (FM) transmit in addition to the program additional information such as the station name, type of program (e.g. pop, culture, etc.), traffic station identification and alarm messages. This information is evaluated and shown on the radio and navigation unit (A2/56) display, provided that:

- the "RDS" function is switched on
- an RDS station is set and received.

When an RDS station is received with a traffic broadcast in the background the abbreviation "TP" (Traffic

Program) appears on the radio and navigation unit display (A2/56).

Even when the RDS function is deactivated, the traffic station recognition and station following function remain in operation (if activated). RDS alarm messages are still issued. In this case, CD playback or radio reception is automatically interrupted.

2-tuner technology function

If interference occurs to reception while driving, the system attempts to receive the selected station on an alternative frequency with the aid of the second (integrated) receiver and switch over when reception is better. Moreover, the second radio receiver automatically generates a list of the receivable FM stations after switch-on, and this list is continuously updated during operation. The stations contained in the list can be called up sorted in alphabetical order with the station search buttons.

i The station list is only available when the "RDS" function is activated.

At certain times, some radio channel programs are subdivided into regional programs.

Since the system automatically switches to an alternative frequency in the event of reception interference, this can lead to a change in the regional program (not the radio network). If this is not desired, the regional program function can be activated in the menu "REG". Switchover to an alternative frequency is then accomplished only within the regional program.

FM antenna diversity function (models 209.3/4)

The antenna diversity function undertakes a reception-specific switchover between the FM antennas on the rear window for model 209.3 (FM antennas of windshield for model 209.4). The function runs automatically and is executed by the window antenna amplifier module 1 (A2/71) for model 209.3 (left antenna amplifier module (A2/64) for model 209.4).

The radio tuner of the radio and navigation unit (A2/56) only generates the intermediate frequency (ZF) signal, which serves as a reference to change the FM antenna for the window antenna amplifier module 1 (A2/71) on model 209.3 (for model 209.4 left antenna amplifier module (A2/64)).

RDS Diversity/2-receiver technology function

The system consists of 2 FM receivers, a radio receiver and a search receiver. After turning on the radio system, the search receiver automatically generates a list of FM stations received, which is continually updated during operation.

Data such as reception quality, programs and alternative frequencies are stored. The audio receiver can therefore switch over inaudibly to an alternative frequency. The list appears in alphabetical order when the "FM station list" is called up. The stations which are displayed can be activated by selecting and confirming.

	FM/AM antenna amplifier, location/task/design/ function	Models 163, 168, 170, 208.4, 210.2 Models 208.3, 210	**GF82.62-P-4101A**

		(except 210.2) except code 352a	
	Antenna amplifier module, location/task/design/ function	Models 203.0/7, 209.3	GF82.62-P-3105PP
		Model 203.2	GF82.62-P-3105PS
		Model 209.4	GF82.62-P-3105QA
	Additional fan for radio/navigation unit, location/ task	Models 203.0/2/7 as of 1.6.03	GF82.61-P-4110P
	Rear window antenna, location/task/design/ function	Models 203.0/7, 209.3	GF82.62-P-3106PP
		Model 203.2	GF82.62-P-3106PS
	Windshield antenna, location/task/design/ function	Model 209.4	GF82.62-P-3112Q
	Sound amplifier, location/task/design/function	Models 209.3/4 with code (810) sound system Models 203.0/2/7 up to 23.4.04 with code (810) Sound system	GF82.62-P-3100Q
		Models 203.0/2/7 as from 24.4.04 with code (810) sound system, except code (498) Japan version, except code (494a) USA version	GF82.62-P-3100PM

RADIO MODE, FUNCTION - GF82.60-P-2001GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

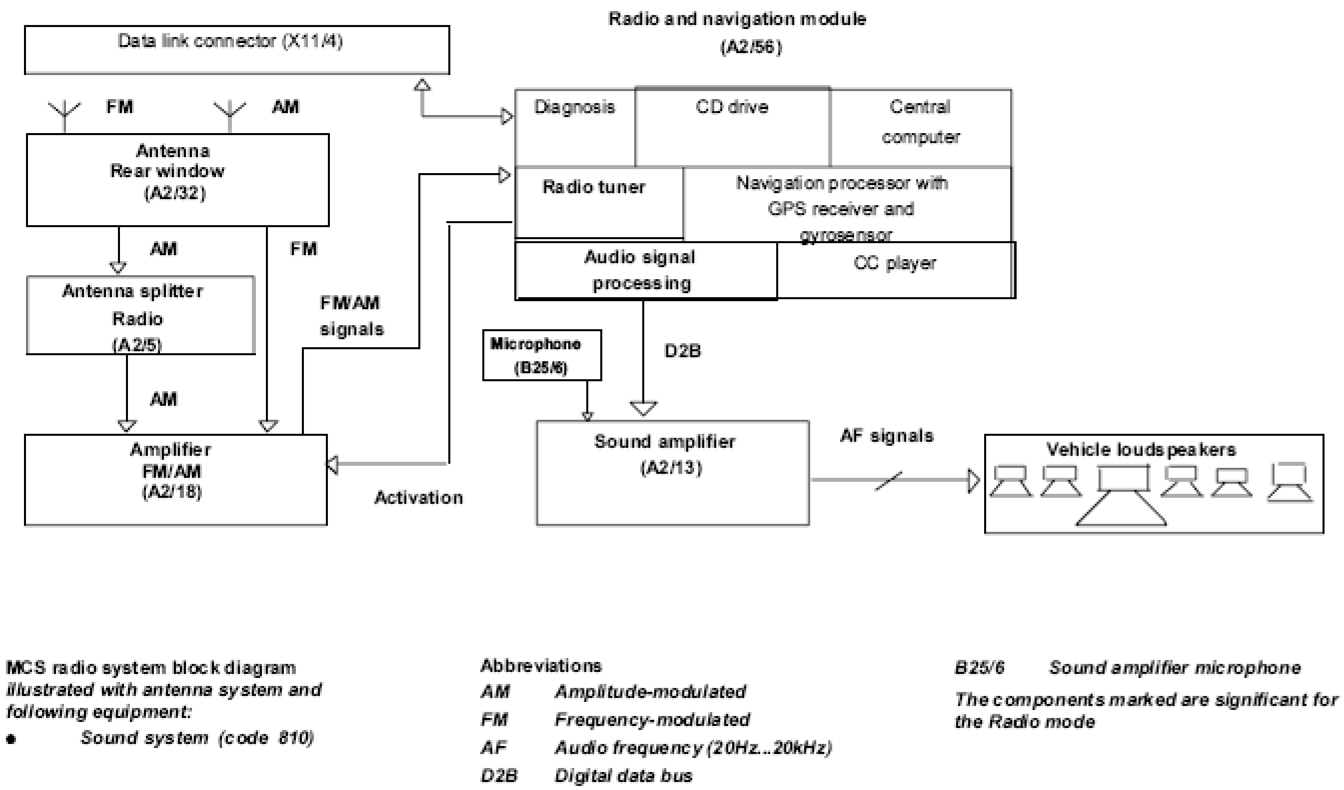


Fig. 37: Identifying Radio Mode Function

The **MCS** radio menu is activated by pressing the **"RADIO"** button on the **radio and navigation module (A2/56)** .

Radio reception, function

The **rear window antenna (A2/32)** receives the high frequency **FM** and **AM** signals. The music, voice and/or data signal is superimposed on these high-frequency carriers. The **radio antenna splitter (A2/5)** decouples the **AM** signals from the heater current in the rear window and relays them to the **FM/AM amplifier (A2/18)** , while the **FM** signals are transmitted directly from the rear window to the **FM/AM amplifier (A2/18)** . The **FM/AM amplifier (A2/18)** filters the frequencies of the radio frequency bands from the high frequency signals received and amplifies these signals.

The amplified signals are then transmitted to the radio tuner integrated into the radio and navigation module (A2/56) by the **FM/AM amplifier** (A2/18) via a common co-axial line (**FM, AM**)

The radio receiver **demodulates** the high-frequency signals, i.e. it separates the useful information (audible frequencies) from the carrier signal (inaudible).

The demodulated audio signals are amplified and converted into sound signals by the vehicle loudspeakers.

The MCS radio system offers the following possibilities for station selection and adjustment:

- manual station search is activated by actuating the **"joystick** "to left or right. The station search feature stops at the next station found, even when the" **joystick** " continues to be actuated.
- Automatic station search with **scan** function can be activated by pressing the multifunction " **Scan** " key. Each station received in the frequency range is played for **approx. 8 s** This function is possible only in the forward direction. When activated " **Scan** " appears inverted on the display.
- Manual fine coordination

  The frequency can be changed when the" **joystick** " is moved up or down.

- Station selection from memory

  For each frequency range (memory **FM, AM**) there are **10** memory buttons available. Press button of number block approx. **2 s** to store a station. When a station is stored it is confirmed by an acoustic signal. Any station stored previously is written over.

i In the frequency range **WB** (weather forecast) 7 stations are preset. These stations can be called by momentarily pressing the desired number of the number block.

- Station selection with frequency input via number block Pressing the" *" button followed by actuation of the number keys allows direct entry of the desired frequency. Undesired entries can be erased with the" **Clear** " button.
- Station selection from the **FM** or **AM** station list by pressing the multifunction key" **List** " all stored stations in the momentary frequency range are listed. Exit station list by pressing **FM** or **AM multifunction key** .
- Automatic storage

  The **"Auto"** multifunction key (when pressed for longer than **2 s**) starts automatic storage of the **10** strongest stations in the corresponding frequency range. The stations are stored according to the strength of the received signals in decreasing order.

	Volume/tone adjustments, function		**GF82.60-P-2003GI**
	Antenna system (AS), location of components		**GF82.62-P-0001-03D**
	FM/AM antenna amplifier, location/purpose/ design/function		**GF82.62-P-4101A**

CD-PLAYER MODE, FUNCTION - GF82.60-P-2002B

MODELS 163, 168, 170, 203.0 /2 /7, 208, 209.3 /4, 210 with CODE (353) Audio 30 APS

CD's can be played on the CD drive integrated into the radio and navigation unit (A2/56) or with the CD player with changer (in glove compartment) (A2/6). The audio data are transmitted over the Digital Data Bus (D2B). The CD disk drive is a double-speed standard CD disk drive, which is suitable both for playing back audio CDs

and for reading and loading navigation data from navigation data CDs.

i A special navigation CD must be inserted for navigation purposes.

The CD player integrated into the radio and navigation unit (A2/56) provides the following audio functions:

- Fast forward or reverse (music search) The music played is audible during fast forward or reverse.
- "Scan" function

  Each track on a CD is played for 8 s. After a complete run through, the scan function is automatically terminated.

- "Random" function

  All the tracks on a CD are played according to a random selection.

- "Repeat" function

  The current track is repeated.

- "Display" function

  The number and elapsed playing time for the current track, the total playing time and the number of tracks on the CD are displayed.

i Each CD includes a permanently stored table of contents (TOC record). The table of contents (TOC entry) contains information such as the number of tracks on a CD and the CD's total playing time.

CD playback is automatically interrupted by the following functions (pause function):

- Traffic messages and public warning messages over the radio data system (RDS)
- Incoming telephone calls

CD playback is continued at the position at which the interruption took place. No part of the track is skipped during the pause function.

i The CD playback volume is only reduced during navigation system voice output.

	CD player with changer, location/task/design/ function	Models 209.3/4	GF82.64-P-3113Q
		Models 203.0/2/7 with code (819) CD changer 6 disc	GF82.64-P-3113PA
		Models 163, 208, 210 with code (819)	**GF82.64-P-3113B**

		CD changer 6-disc	
	Sound amplifier, location/task/design/function	Models 209.3/4 with code (810) sound system Models 203.0/2/7 up to 23.4.04 with code (810) Sound system	GF82.62-P-3100Q
		Models 203.0/2/7 as from 24.4.04 with code (810) sound system, except code (498) Japan version, except code (494a) USA version	GF82.62-P-3100PM
	Additional fan for radio/navigation unit location/ task	Models 203.0/2/7 as of 1.6.03	GF82.61-P-4110P

CD-PLAYER MODE, FUNCTION - GF82.60-P-2002GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

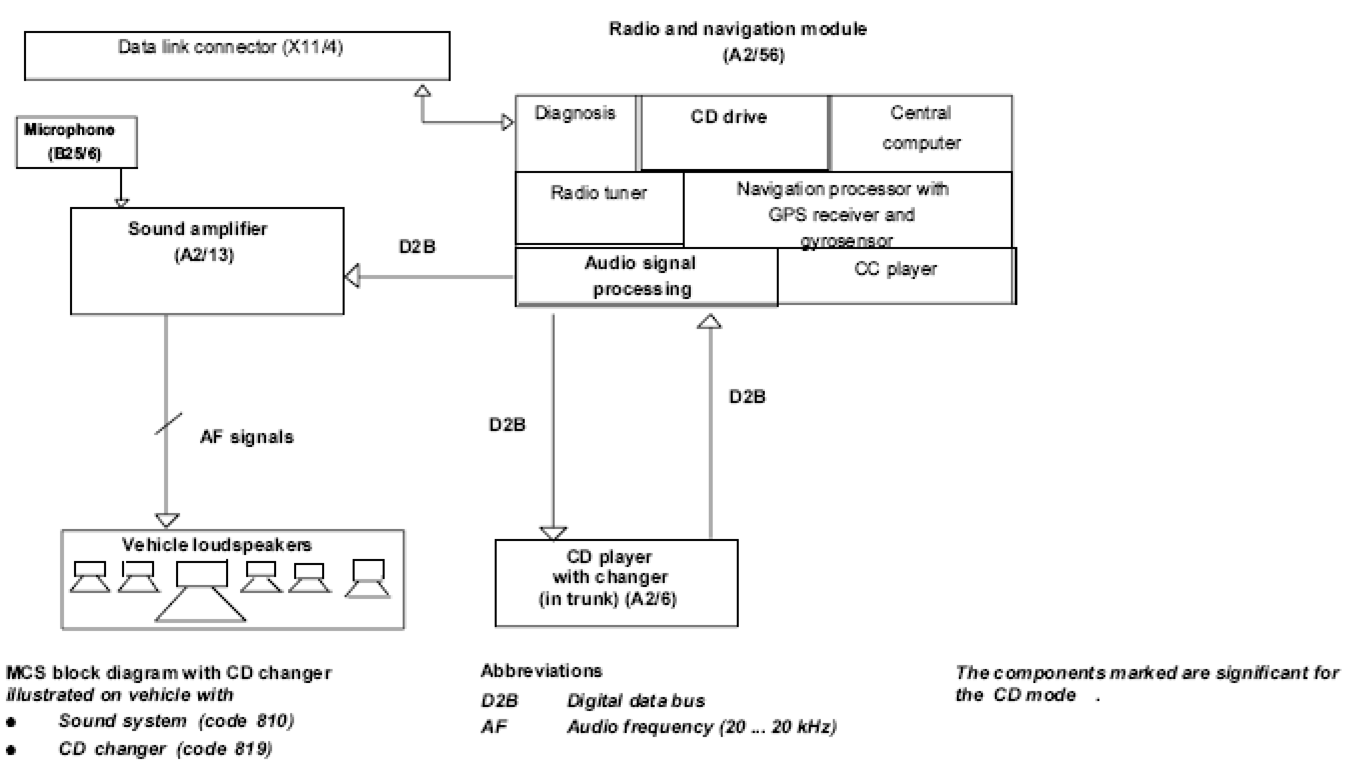


Fig. 38: Identifying CD-Player Mode Function

The **radio and navigation module (A2/56)** has various optional possibilities for the CD player mode.

CD mode with single CD drive (optional)

The **radio and navigation module (A2/56)** has an integrated CD drive as an option (code 818) intended for playing **audio CD's** . If the **radio and navigation module (A2/56)** is equipped with a **CD** drive for navigation (Code 357) as an option, it is also possible to play **audio CD's** . (However, during the navigation mode it is not possible to play **audio CD's** Opening the operating and display module "(**Open** " button) allows access to the **CC** slot and **CD** slot.

CD changer mode (with code 819)

The **CD player with changer (A2/6)** is actuated by the **radio and navigation module (A2/56)** .

The control signals and audio data from the **CD player with changer (in trunk) (A2/6)** are transmitted via the digital data bus (**D2B**). The changer is actuated by pressing the "CD" button **twice** . (When single CD drive is installed).

Insert only 12 cm CD's into the **CD player with changer (in trunk) (A2/6)** , also do **not use 8 cm CD adapter** .

On sound system (code 810) the **sound amplifier (A2/13)** takes over final amplification of the audio signals.

The signals between the **radio and navigation module (A2/56)** and **sound amplifier (A2/13)** are transmitted via the digital data bus (**D2B**).

The amplified signals are output by the vehicle loudspeaker system.

i If the vehicle is equipped with **sound amplifier (A2/13)** the **radio and navigation module (A2/56)** should be coded correspondingly with STAR diagnosis, otherwise malfunctions can occur when reproducing audio signals.

When a magazine is inserted in the **CD** changer it is checked and a table of contents is made up. When the test is completed the system automatically switches over to the playback mode and starts with the first title or next possible compact disc.

If the system switches over to the **CD** mode before the test is completed the system starts playback of the **CD** which was presently being checked.

The radio and navigation module (A2/56) offers the following functions in combination with the **CD player with changer (in trunk) (A2/6)** and/or **single CD drive** :

- **Scan function**

  When the multifunction " **Scan** " key is pressed each title on the current CD is played for approx. **8 s** . The function is terminated by pressing the multifunction " **Scan** " key again.

- **Title forward/backward**

  If the "**joystick** " is pressed to right the next **CD** title is skipped. Pressing to left within the first **10 s** of playback causes jumping to the previous title, otherwise to the beginning of the title presently being played. If the" **joystick** " is held to left or right the changer jumps from one title to the next within short time intervals without playing them.

- **Fast forward/rewind (music search)**

  If the "**joystick** " is pressed up or down the titles are played quickly. This allows specific parts of a title to be played or skipped. When the start or end of the **CD** is reached the search is interrupted.

- **Title repetition and random playback**

  Random playback can be activated/deactivated with the multifunction " **RDM** " key. When activated this function is indicated on the display and random playback can then be selected. The random playback feature affects only the **CD** presently being played back. Title repetition can be activated/ deactivated with the multifunction " **RPT** key. The title presently selected is repeated until the function is deactivated.

  [i] The random playback and title repetition remain active, even when the **radio and navigation module (A2/56)** is switched off and switched back on again. Actuating these two functions simultaneously is not possible.

- **Pause**

  The multifunction key" **II** "(**Pause**) interrupts the title presently being played. Pressing again continues playback.

- **Direct title selection**

  Pressing the " *" button followed by entry of the desired title via the number block allows direct selection of the title.

- **Multifunction key Time**

  By pressing the multifunction key" **Time** " it is possible to change between 2 different display modes:

  - Display of title number and previous playback time of title (standard setting)
  - Number of titles and entire playback time of **CD** ("**Time** appears on display).

CD title assignment, function

Each **CD** has a permanently stored, so-called **T** able of **C** ontents (**TOC**) entry. The **radio and navigation module (A2/56)** recognizes the **CD** clearly on the basis of this entry and can automatically designate it (even when the CD is then inserted into another CD magazine) after the title has been assigned once by the user.

Moreover, the **TOC** entry includes information about the number of titles on a **CD** and the entire playing time of the **CD** .

	Volume/tone adjustments, function		**GF82.60-P-2003GI**
	Radio/navigation module, location/purpose/ design/function		**GF82.61-P-4109GI**

VOLUME/TONE ADJUSTMENTS, FUNCTION - GF82.60-P-2003B

MODEL 163, 168, 170, 203.0 /2 /7, 208, 209.3 /4, 210 with CODE (353) Audio 30 APS

Basic features

The balance and fader settings apply for all signal sources (radio, CD, voice output).

The base and treble settings can be stored separately for the following signal sources:

- Radio
- Traffic announcements
- Navigation voice output
- Integrated CD player
- Optional CD changer

Volume and tone settings for traffic announcements

The volume for traffic announcements can be changed during a traffic announcement (procedure analog to adjusting navigation system voice output).

Volume and tone settings for navigation system voice output

The volume is automatically increased by a defined level during voice output. The volume level increase can be set in stages directly at the radio (A2). The radio is preset to 6 dB.

During voice output, the volume can be changed with the left knob. The base/treble settings can be changed with the right knob after pressing the "tone" button (during voice output). The settings can be continued after conclusion of the voice output; the setting mode is terminated 8s after actuating the last button.

	Switch on/off behavior, function		**GF82.85-P-2006B**

VOLUME/TONE ADJUSTMENTS, FUNCTION - GF82.60-P-2003GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357)

Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

It is necessary to distinguish between audio and service sources on the **radio and navigation module (A2/56)** :

- **Audio sources** are:
  - Radio
  - CD player
  - CC player
  - CD changer (code 819a)
- **Service sources** include:
  - Voice output on navigation
  - telephone

Signal editing required for **volume and tone settings** is accomplished by the audio component integrated into the **radio and navigation module (A2/56)**

If the vehicle is additionally equipped with a sound system (code 810), the **sound amplifier (A2/13)** ensures final audio signal amplification.

- **Volume setting**

  By turning the volume knob the volume of the corresponding mode changes.

- **Tone setting**

  The tone settings as well as the general brightness adjustment of the display can be reached by pressing the multifunction key" **ADJ** ". If the multifunction key" **ADJ** " is pressed for longer than **2 s** all tone settings of all modes jump back to the center position. This is confirmed by a short peep tone. The adjustment possibilities for treble/bass, balance and fader are summarized in one display.

  They can be selected by actuating the multifunction keys " " and " ". The corresponding setting can be changed by actuating the multifunction keys"**-** " and "**+** " or "**L** ", "**R** ", "**F** " and "**R** ".

i These settings can also be made with the "**joystick** " in an analogous manner. When the headlamps are switched on the brightness setting of the display can be reached by pressing the multifunction key" **BRT** " in the tone setting menu. Here it is possible to select between " **bright** " and "**dark** ". Simultaneously pressing the multifunction keys " **-** " and "**+** " or "**L** " and "**R** " or "**F** " and "**R** " resets the corresponding setting in the current mode to the center position

i Tone setting is not possible in the telephone or navigation mode. The tone or brightness setting can be exited by pressing the multifunction key **EXIT** ".

	Voice output, function		**GF82.85-P-3001GI**

	Radio and navigation module, location/purpose/ design/function		GF82.61-P-4109GI

AUDIO 30 APS, LOCATION OF COMPONENTS - GF82.61-P-0002-01D

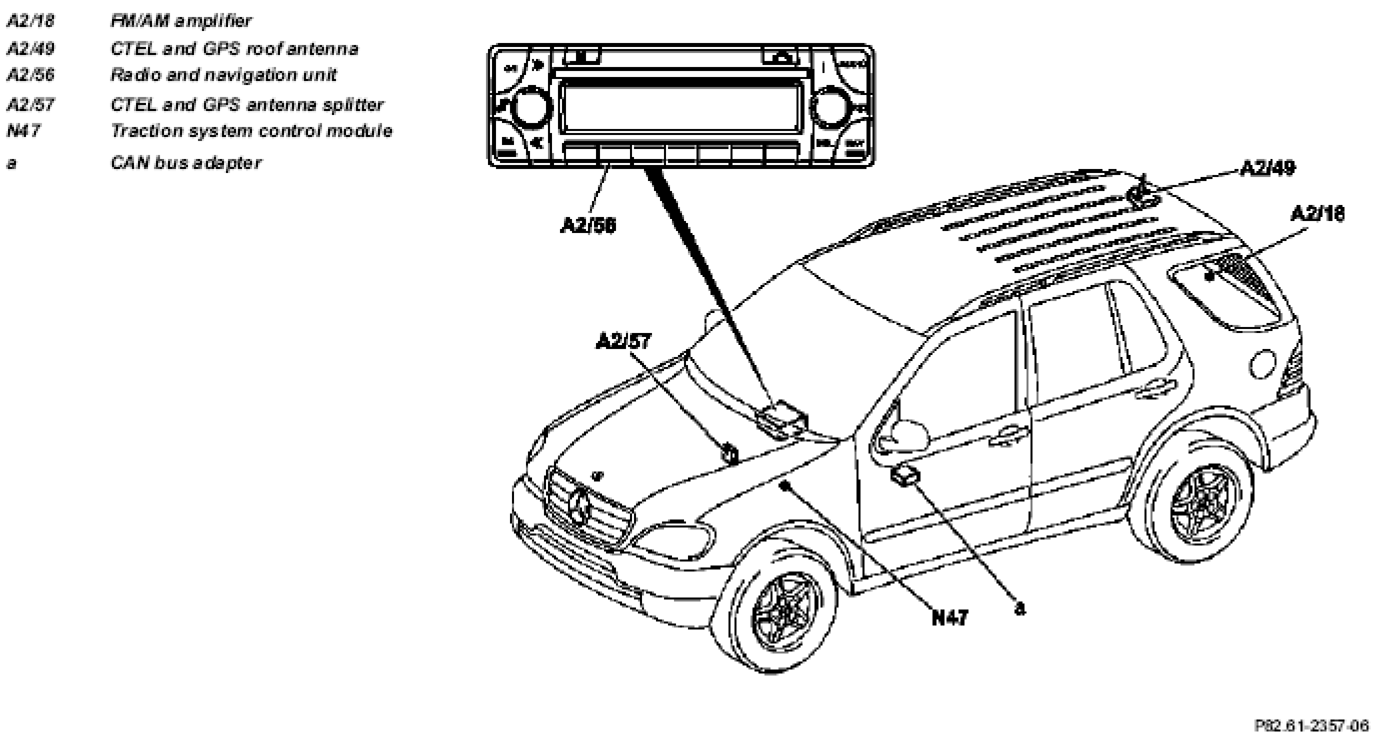


Fig. 39: Identifying Audio 30 APS Components Location

The FM/AM *antennas are located in the rear window .*

AUDIO 30 APS BLOCK DIAGRAM - GF82.61-P-0002-02D

Model 163 with code 353

A2/56	*Radio and navigation unit*
D2B	*Digital data bus (The D2B interface serves for data exchange with other D2B compatible (audio) components)*
CAN	*Controller area network*
N47	*Traction systems control module*

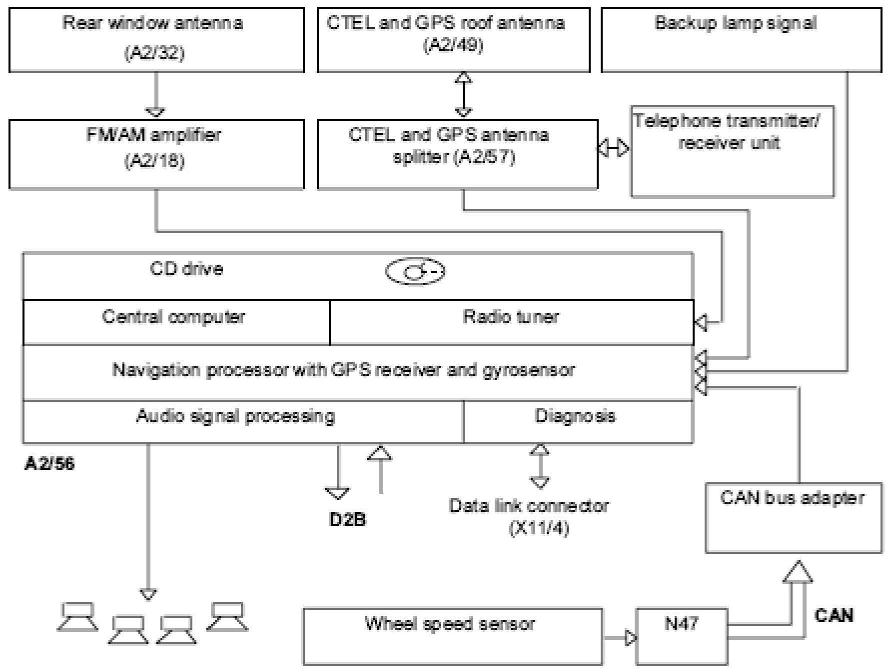


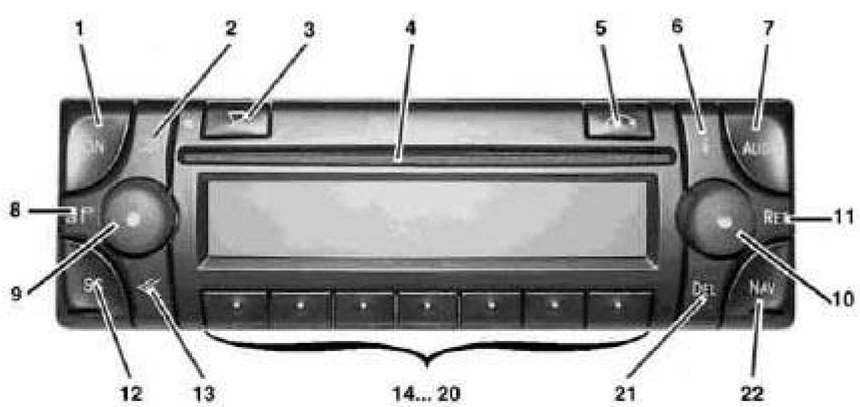
Fig. 40: Identifying Audio 30 APS Block Diagram

AUDIO 30 APS OPERATING INSTRUCTIONS - GF82.61-P-0002-03A

Models 163, 168, 170, 208, 210 with code 353

Controls on radio and navigation unit (A2/56) with explanations of primary functions.

1	*Button for switching unit on and off*
2	*Button for station search and CD title skip (forward)*
3	*Button for muting radio*
4	*CD opening*
5	*CD eject button*
6	*"I (NFO)" button for navigation*
7	*Selection button for radio or CD mode*
8	*Button for calling tone settings*
9	*Left knob with button*
10	*Right knob with button*



11	*Button for return to previous menu*
12	*"SC(AN)" button for scanning CD titles and radio stations*
13	*Button for station search and CD title skip (reverse)*
14...20	*Multi-function buttons for menu-guided control*
21	*Button for deleting navigation entries*
22	*Button for calling navigation*

Fig. 41: Identifying Radio And Navigation Unit Controls

Activating anti-theft alarm

During **initial operation** of the **radio and navigation unit (A2/56)** it is necessary **to activate the anti-theft alarm** with the aid of the hand-held tester.

i After activation has been accomplished, deactivation is no longer possible.

Only after activation is it necessary to enter a 5-digit code after interruption of the power supply. When entering the code observe:

- After the code has been entered incorrectly three times the message "Wait" appears. The **radio and navigation unit (A2/56)** is then disabled for ten minutes. ?
- Following the next three incorrect entries operation is not possible for ten minutes again. ?
- Then after an additional 3 incorrect entries the unit is disabled for 1 hour in each case.

i The waiting time expires only with the **radio and navigation unit (A2/56)** switched on.

Inserting and ejecting CD

CDs can be inserted and ejected (audio or navigation CD) in all operating states. After pressing the "eject button" a CD already inserted is **ejected** by a motor. If the CD is not removed within approx. 14 seconds, it is pulled back in automatically.

After **inserting** a CD it is necessary to push it a slight distance into the CD opening; it is then pulled in the rest of the way automatically.

i When a navigation CD is inserted the **menu for entering destination** is activated automatically. However, this applies only when the system has previously requested that the navigation CD be inserted.

i The eject button for the CD drive also functions when the **radio and navigation unit (A2/56)** is in the "code wait state". This means that a CD can be removed in spite of the request to enter the anti-theft code.

Glossary

Abbreviation	**Meaning**	**Explanation**
AM	**A** mplitude **M** odulation	The amplitude of the carrier frequency is modulated with the signal (e.g. LW, MW and SW radio)
CD	**C** ompact **D** isc	Storage medium for all types of data (music, programs,).
D2B	**D** igital **D** ata **B** us	Optical bus system for transfer of data via fiber optic cable.
FM	**F** requency **M** odulation	The signal is transmitted by changing the frequency of the carrier (e.g. FM radio)

GPS	**G** lobal **P** ositioning **S** ystem	System for position finding with the aid of satellites
GSM	**G** lobal **S** ystem for **M** obile or also **G** lobal **S** tandard of **M** obile communication	International standard for mobile telecommunication.
LW	**L** ong **W** ave	Certain relatively low frequency range within which radio signals are transmitted (compare UHF and MW).
MW	**M** edium **W** ave	Certain frequency range within which radio signals are transmitted (compare UHF and LW).
POI	**P** oints of **I** nterest	Locations of geographic or tourist interest.
PTY	**P** rogram **Ty** pe	RDS feature describing the program contents of the radio station (pop, culture, classics,)
RDS	**R** adio **D** ata **S** ystem	Standard for transmission of information via FM radio station (station name, e.g. SWR3 or program type (see PTY),)
TCS	**T** raffic **C** enter **S** ervice	Standard for transmission of traffic information via cellular telephone network. Presently not used by **Audio 30 APS** (status: 3/99)
TMC	**T** raffic **M** essage **C** hannel	Standard for FM / RDS transmission of traffic information. Presently not used by **Audio 30 APS** (status: 3/99)
TP	Traffic Program	RDS feature. Indicates that the station tuned in is a traffic station.
UKW	Ultra-high frequency	Certain frequency range within which radio signals are transmitted (relatively high frequency, compare LW and MW).
ZE	Destination entry	Entry of town and street name for desired trip destination.
ZF	Guidance Other terms: Intermediate frequency	Function of navigation system. The IF signal is required for the antenna diversity function. With this function the antenna with the best reception is automatically selected on vehicles with a system of FM antennas. This function is

		not used presently. (Status: 3/99)

AUDIO 30 APS, FUNCTION - GF82.61-P-0002A

MODEL 163,168,170, 208, 210 with CODE (353) Audio 30 APS

A2/56 Radio and navigation unit



Fig. 42: Identifying Radio And Navigation Unit

The **Audio 30 APS** has the following functions:

- **Radio**

  Performance corresponds to an MB radio in the superior class (3/99)

- **Navigation system**

  Performance and function are comparable with the current auto-pilot system (APS) (status 3/99)

- Combined **CD player** for audio and navigation
- **Audio signal processing and amplification** with control of optional units, e.g.:

  Amplifier for sound system (N40/3) and CD changer (A2/6)

- **Digital data bus (D2B)** and **CAN data bus** interface

The system is distinguished by its high degree of integration resulting in optimum compactness. The following components are integrated into the **radio and navigation unit (A2/56)** :

- CD-ROM drive for navigation and playing audio CD's
- Navigation processor including global positioning system (GPS) receiver and gyrosensor
- Radio with two-tuner technology

- 4-channel power amplifier for vehicle loudspeakers

System interlinkage

The **radio and navigation unit (A2/56)** is provided with the following components for data exchange with external digital components:

- **CAN (A1 -A2/56)**

  The **radio and navigation unit (A2/56)** is connected with the **instrument cluster (A1)** via a separate CAN bus. The difference to the other CAN systems is indicated by the spelling CAN bus (A1-A2/56). The CAN bus (A1-A2/56) allows the following functions:

  - Operation of the **radio and navigation unit (A2/56)** is also possible with the multifunction steering wheel.
  - The **multifunction display (A1/p13)** in the **instrument cluster (A1)** can display navigation information on the current operating status of the **radio and navigation unit (A2/56)** .

  i The connection to the CAN bus (A1-A2/56) is only realized on models 208 and 210. (Status 3/99)

- **Digital data bus (D2B)**

  Data can be exchanged between the external audio components, the telephone system and - if present - the voice control system over the **D2B** bus. This allows **control data** as well as the actual **audio signals** (e.g. music from CD changer) to be transferred.

  i The only additional D2B component presently possible is the **CD changer (A2/6)** (Status: 3/99)

- **K bus (diagnostic interface)**

  Data exchange is accomplished between the diagnostic interface and the hand-held tester (reading out DTCs and actual values, ...).

  i The communication between the HHT and all other D2B components is accomplished over the **radio and navigation unit (A2/56)** diagnostic interface.

	Audio 30 APS, location of components	Model 163	**GF82.61-P-0002-01D**
		Model 168	GF82.61-P-0002-01B
		Model 170	GF82.61-P-0002-01A
		Model 208, model 210	&.2.(GF82.61-P-0002-01C)
	Audio 30 APS block diagram	Model 163	**GF82.61-P-0002-02D**
		Model 168	GF82.61-P-0002-02B

		Model 170	GF82.61-P-0002-02A
		Models 208, 210	**&.2.** (GF82.61-P-0002-02C)
	Audio 30 APS operating instructions		**GF82.61-P-0002-03A**
	On/Off behavior, function		**GF82.85-P-2006B**
	Navigation mode, function		**GF82.85-P-2012B**
	Radio mode, function		**GF82.60-P-2001B**
	CD player mode, function		**GF82.60-P-2002B**
	Volume and tone settings, function		**GF82.60-P-2003B**
	Digital data bus (D2B), function		**GF82.00-P-0001A**
	Radio and navigation unit, location/purpose/ design/function		**GF82.61-P-4109A**

TABLE OF CONTENTS, FUNCTION DESCRIPTION OF AUDIO 30 APS - GF82.61-P-0998ZZ

MODEL 163, 168, 170, 203.0 /2 /7, 208, 209.3 /4, 210 with CODE (353) Audio 30 APS

	Audio 30 APS, function	Models 163, 168, 170, 208, 210 Model 203, 209.3/4	**GF82.61-P-0002A** GF82.61-P-0002E
	Audio 30 APS location of the components	Model Series 163 Model 168 Model 170 Models 203, 209.3 Model 209.4 Models 208, 210	**GF82.61-P-0002-01D** GF82.61-P-0002-01B GF82.61-P-0002-01A GF82.61-P-0002-01E GF82.61-P-0002-01F GF82.61-P-0002-01C
	Audio 30 APS block diagram	Model Series 163 Model 168 Model 170 Models 203, 209	**GF82.61-P-0002-02D** GF82.61-P-0002-02B GF82.61-P-0002-02A GF82.61-P-0002-02E

		Models 208, 210	GF82.61-P-0002-02C
	Audio 30 APS operating instructions	Models 163, 168, 170, 208, 210 Model 203, 209	**GF82.61-P-0002-03A** GF82.61-P-0002-03E
	Switch on/off behavior, function		**GF82.85-P-2006B**
	Navigation mode, function	Models 163, 168, 170, 208, 210 Model 203, 209	**GF82.85-P-2012B** GF82.85-P-2012EE
	Radio operation, function		**GF82.60-P-2001B**
	CD-player mode, function		**GF82.60-P-2002B**
	Telephone mode, function	Model 209	GF82.85-P-2007QA
	Volume/tone adjustments, function		**GF82.60-P-2003B**
	Loading language, function		**GF82.61-P-3003B**
	Basic location finding, function		**GF82.61-P-3006D**
	Global positioning system location finding, function		**GF82.61-P-3007C**
	Map-supported location finding, function		**GF82.61-P-3008C**
	Route calculation, function		**GF82.61-P-3011E**
	Destination guidance, function		**GF82.61-P-3012D**
	Destination guidance in digitalized map area, function		**GF82.61-P-4000C**
	Destination guidance in non-digitalized map area, function		**GF82.61-P-4001C**
	Dynamic route guidance, function		**GF82.61-P-4003QA**
	Survey of system components, Audio 30 APS, location/task/design/function		**GF82.61-P-9998ZZ**

CONSTANT MAP MATCHING, FUNCTION - GF82.61-P-2002GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

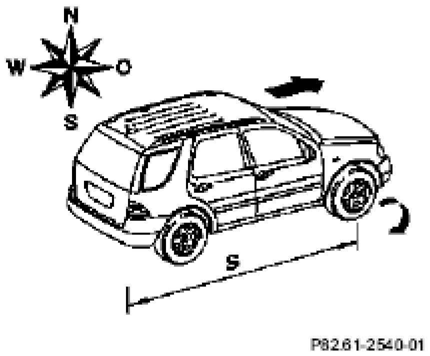


Fig. 43: Identifying Basic Location Finding Via Compass Direction Distance Traveled

Basic location finding *(dead reckoning) via compass direction and distance traveled*

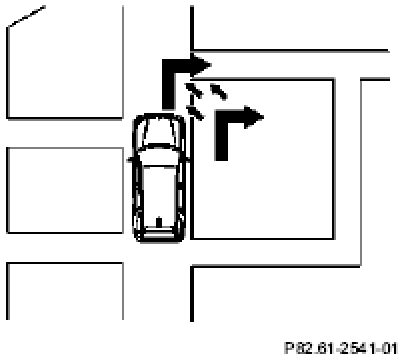


Fig. 44: Identifying Map-Supported Map Matching

Map-supported map matching (map matching)

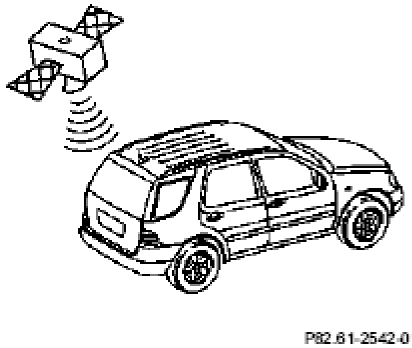


Fig. 45: Identifying GPS Satellite Location Finding

GPS satellite location finding

Permanent location finding

Is the calculation of the current vehicle position. It is active when the ignition is switched on and is performed

by the **navigation processor** Integrated Into the **radio and navigation module (A2/56)** .

During the switch-on phase (software is loaded), only basic map matching is available.

When the ignition is switched off all important location finding parameters are stored for the duration of the shut-off delay (approx. **60 min)** .

The **permanent location finding feature** uses **three** procedures which supplement each other ensuring very precise and reliable location finding:

- **Basic location finding (dead reckoning)**
- **Map-supported location finding (map matching)**
- **GPS location finding**

i **Manual entry of vehicle location**

It is possible to enter the location manually on the operating and display module. This can be useful in the following cases:

- Following vehicle transport

  (e.g. ferry or train) or

- when GPS reception is not present when trip is started

	Basic location finding, function		**GF82.61-P-3006GI**
	Global positioning system location finding, function		**GF82.61-P-3007GI**
	Map-supported location finding, function		**GF82.61-P-3008GI**
	Radio and navigation module, location/purpose/ design/function		**GF82.61-P-4109GI**

LOADING LANGUAGE, FUNCTION - GF82.61-P-3003B

MODEL 163, 168, 170, 203.0 /2 /7, 208, 209.3 /4, 210 with CODE (353) Audio 30 APS

Function

The data for navigation voice output is stored originally on the navigation DVD. They are transmitted with the help of the DVD drive of the radio (A2) into the memory of the navigation processor and are then available anytime for navigation.

The language is reloaded in the following cases:

- automatically, after voltage to the radio (A2) was interrupted
- manually, by activating the "SPRA" menu in the navigation mode

[i] Loading the language requires approx. 20 s.

If the system is switched off while loading the language, the language data is lost and must be reloaded again. Avoid strong vibrations to the vehicle (e.g. extremely bumpy roads) while the language is being loaded.

[i] The navigation processor is integrated in the radio (A2).

	Route calculation, function		**GF82.61-P-3011E**

BASIC LOCATION FINDING, FUNCTION - GF82.61-P-3006D

MODELS 163, 168, 170, 203.0 /2 /7, 208, 209.3 /4, 210 with CODE (353) Audio 30 APS

Basic representation of the basic location finding shown on model 210

Basic location finding (dead reckoning) is the basic function of continuous location finding. It is permanently carried out by the navigation processor that is integrated in the radio (A2) when the ignition is switched on (approx. once per second) and is irrespective of the data of the DVD map. After switching off the ignition, the current position is stored for the duration of the system shut-off delay time.

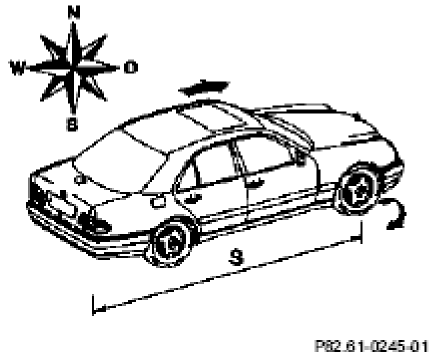


Fig. 46: Identifying Basic Location Finding Function

The following information is calculated with the aid of basic location finding:

- Distance traveled
- Absolute vehicle direction (compass direction)
- Direction of travel (forward or reverse)

Calculation of distance traveled

The navigation processor receives the wheel speed signal of the following components:

- Left rear rpm sensor (L6/3) (model 168)
- Wheel speed sensor, left front (L6/1)
- Right front rpm sensor (L6/2) (model 208, 210)
- Left front rpm sensor (L6/1) and right front rpm sensor (L6/2) (models 203, 209)

The evaluation of the wheel speed signals reveals the mileage covered.

i The wheel speed signals of the not driven wheels are evaluated, since their slip between the roadway and tire is lower, which results in a more accurate result when calculating the mileage.

Calculation of the vehicle orientation

The navigation computer calculates the direction in which the vehicle is traveling (compass direction) from the data from the gyrosensor and the sequence of locations calculated with the aid of the global positioning system (GPS). The difference in the calculated mileage and the mileage actually covered between 2 turn-off points is used to automatically recalibrate the tire circumference (necessary due to tire wear).

Calculation of the direction of motion

The navigation processor recognizes the direction of motion (forward or reverse) from the reverse signal.

Calibration of tire circumference

As a matter of principle, the navigation system recalibrates itself while driving as described. However, this may require driving a longer distance. After changing tires, manual recalibration should therefore be accomplished. To do this, it is necessary to enter the tire size (e.g.:195/050/015)and possibly the following information:

- new tires (tread depth > approx. 5 mm)
- used tires (tread depth < approx. 5 mm)

The entry can be done two different ways:

- With aid of STAR DIAGNOSIS.
- By calling the "Navigation --> TIRE" menu at the radio (A2)

i Errors due to vehicle movement with switched off ignition lead to an inaccurate basic location finding. Rolling backwards without the reverse gear engaged is evaluated as forwards motion, and may lead to an error in the location finding. Rolling with the ignition switched off or vehicle transportation also falsify map matching.

i The errors are, however, corrected automatically after a short time by the navigation processor after receiving GPS data.

i A special calibration drive by driving around a defined test path is not ever required.

	Map-supported location finding, function		GF82.61-P-3008C

BASIC LOCATION FINDING, FUNCTION - GF82.61-P-3006GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

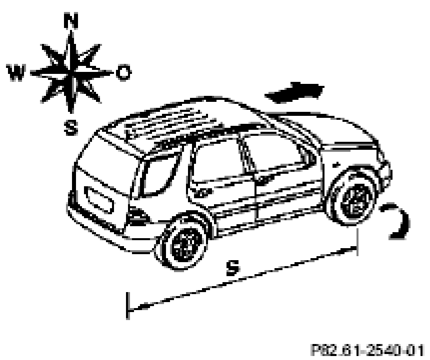


Fig. 47: Identifying Basic Location Finding, Function

Basic location finding (dead reckoning)

Is the basic function of permanent location finding It is accomplished permanently by the **navigation processor** when the ignition is switched on and is not dependent on the **CD-ROM** map.

The current position is stored after the ignition is switched off.

The following information is calculated with the aid of **basic location finding** :

- Distance traveled
- Direction of motion (forward or backward) and
- Direction in which vehicle is pointing

i Basic location finding is accomplished approx. **once per second** .

Distance traveled

The **navigation processor** receives the signals output by the **front right wheel speed sensor (L6/2) from the traction system control module (N47)** via discrete leads.

Evaluation of the wheel speed signals allows calculation of the distance traveled.

Direction of motion

The **navigation processor** recognizes the direction of motion (forward or reverse) from the reverse signal.

Direction in which vehicle is pointing

From the data of the **gyrosensor** and the sequence of the locations calculated with **GPS** the **navigation processor the** calculates the direction in which the vehicle is pointing (compass direction).

The difference between calculated and actual distance traveled between two turning points is used for automatic recalibration of the tire circumference (required due to tire wear).

Location finding errors during basic location finding

Rolling backwards without the reverse gear engaged is evaluated as forward motion, and may lead to an error in the location finding.

Rolling with the ignition switched off or vehicle transportation also falsify map matching.

In both cases the deviation is automatically corrected by the **navigation processor** after receiving **GPS data** .

Calibration

Wheel calibration is not required following tire change.

	Global positioning system location finding, function		**GF82.61-P-3007GI**
	Map-supported location finding, function		**GF82.61-P-3008GI**
	Guidance, function		**GF82.61-P-3012GI**
	Radio and navigation module, location/purpose/ design/function		**GF82.61-P-4109GI**

GLOBAL POSITIONING SYSTEM LOCATION FINDING, FUNCTION - GF82.61-P-3007C

MODEL 163, 168, 170, 203.0 /2 /7, 208, 209.3 /4, 210 with CODE (353) Audio 30 APS

Basic representation of the GPS location finding shown on model 210

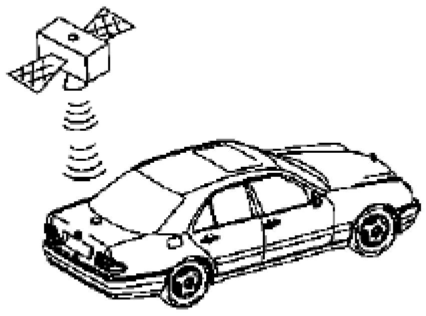


Fig. 48: Identifying Global Positioning System Location Finding

General information

The global positioning system (GPS) is a location finding system established by the US Defense Department and is satellite supported. It is toll-free and is available throughout the world. A lot of satellites are located on different orbits. The GPS satellites constantly transmit time and position data. If data from at least 3 satellites is received it is possible to calculate the position of the receiver.

GPS position finding is irreplaceable for journeys outside the digitized map area and after vehicle transport (e.g. train or ferry journeys and towing). A new GPS location finding (after interruption of satellite reception) can last several minutes (up to 20 minutes when first commissioning the equipment).

Function

The navigation processor that is integrated in the radio (A2) calculates the location of the vehicle and the accuracy of positioning from the satellite signals received and amplified.

The following components can receive satellite data:

- Telephone and GPS roof antenna (A2/49) (model 163)
- GPS antenna (A2/49a2) (model 168, 208.3, 210)
- GPS rear antenna (A2/23a2) (model 170, 208.4)
- GPS antenna (A2/23) (model 203, 209)

The actual calculation is essentially based on the measurement of the travel times of the signals sent synchronously by the various satellites. Here, an important prerequisite is that the satellite and receiver clocks are synchronized .

For this purpose, the receiver has an automatic time correction feature which again is possible with the aid of the satellite signals.

If the navigation processor determines that the basic location finding is less accurate than the GPS location finding, the position currently calculated is corrected using GPS data.

In addition, the vehicle's course of travel is determined with the aid of the sequence of the locations calculated with GPS.

Possible interference when receiving GPS signals

Since GPS operates in the GHz range (microwaves) and the signals are weak, reception interference can occur as the result of:

- atmospheric interference, e.g. weather, water vapor, fog
- multiple reception resulting from reflecting of signals, e.g. from building walls
- Signal shadows, e.g., in built-up areas, tunnel, in the proximity of higher buildings and trees

GPS reception therefore necessitates a clear view of the sky. The location finding accuracy of the GPS system is 100 m or better.

	GPS/CTEL roof antenna location/task/design/ function	Models 163, 168,208.3,210	**GF82.70-P-4111A**
	Global positioning system antenna, location/ task/design/function	Models 170, 208.4	GF82.61-P-4106A
		Models 203, 209.3	GF82.61-P-4106E
		Model 209.4	GF82.61-P-4107Q
	Antenna splitter, location/task/design/function	Model Series 163	**GF82.85-P-3107B**

GLOBAL POSITIONING SYSTEM LOCATION FINDING, FUNCTION - GF82.61-P-3007GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

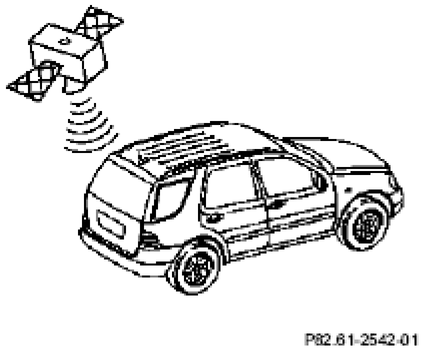


Fig. 49: Identifying Global Positioning System Location Finding

General

The **global positioning system (GPS)** is a satellite-supported location finding system. It is **not subject to fees**

and is available **worldwide** . Presently there are 266 satellites on 6 different earth orbits. The **GPS** satellites permanently transmit time and position data. If data from a **minimum of 3 satellites** is received (with two-dimensional location finding) it is possible to calculate the position of the receiver.

The **GPS location finding** is particularly important when driving outside of the digitized map area and following vehicle transport (e.g. train, ferry or towing).

A **repeated GPS location finding** (following satellite reception interruption) can take several minutes (when unit is initially started up to **20 min** .).

GPS map matching function

The **navigation processor** calculates the location of the vehicle and the accuracy of positioning from the satellite signals received and amplified by the **GPS antenna (A2/49)** . The current calculation is based primarily on the measurement of the **transmission times** for the signals transmitted synchronously by the various satellites. Here, an important prerequisite is that the satellite and receiver clocks are **synchronized** . For this purpose, the receiver has an automatic time correction feature which again is possible with the aid of the satellite signals. If the **navigation processor** determines that the basic location finding is less precise than the **GPS** location finding, the currently calculated position is corrected with the aid of the **GPS data** .

Moreover, the vehicle route is determined from the location sequence calculated with **GPS** .

i Approx. **50 new GPS** location finding calculations are performed each minute.

Possible interference when receiving GPS signals

Since **GPS** operates in the **GHz** (microwave) range and the signals are weak, **reception interferences** can occur from

- **atmospheric interferences,** e.g. weather, water vapor, fog,
- **multiple path reception** due to signal reflections, e.g. from building walls
- **Signal shadows,** e.g. in built-up areas, tunnels, high buildings, trees

A free view of the sky is therefore necessary for **GPS reception** The location finding accuracy is **approx. 100 m or better** .

	Basic location finding, function		**GF82.61-P-3006GI**
	Map-supported location finding, function		**GF82.61-P-3008GI**
	Guidance, function		**GF82.61-P-3012GI**
	Radio and navigation module, location/purpose/ design/function		**GF82.61-P-4109GI**
	GPS roof antenna/telephone,		**GF82.70-P-4111A**

	location/purpose/ design/function		

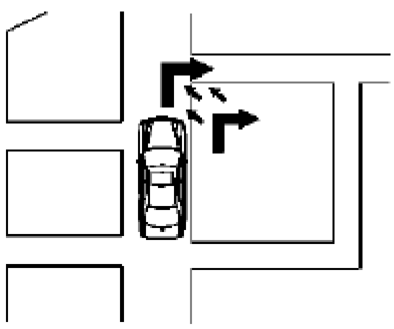
MAP-SUPPORTED LOCATION FINDING, FUNCTION - GF82.61-P-3008C

MODEL 163, 168, 170, 203.0 /2 /7, 208, 209.3 /4, 210 with CODE (353) Audio 30 APS

Basic representation of the map-supported location finding shown on model 210

Map-supported location finding (map matching) is available only in the digitized area of the DVD map.

A deviation can be recognized and corrected automatically by comparing the calculated position of the vehicle with the possible positions on the DVD map.



P82.61-0247-01

Fig. 50: Identifying Map-Supported Location Finding Function

Function

The position of the vehicle is continuously followed on the DVD map by the navigation processor. A number of alternative routes are calculated preliminarily in the digitized area of the DVD map. If the route driven varies from one of the possible routes, the position coordinates for basic location finding are corrected where necessary.

i The navigation processor is integrated in the radio (A2).

Loading the DVD map data

The navigation processor has a read/write memory (RAM) for storing the DVD map data. However, this memory is not large enough to store the entire DVD map (currently approx. 10 %). For this reason, the navigation processor loads into the memory only the map data required for route guidance.

Here, different storage methods are used depending on whether the destination is in the near vicinity of the vehicle or further away:

The following methods are used to store the data:

- If the destination is in the near vicinity, a map area is loaded within a radius of approx. 100 km of the vehicle location ("Local area").
- For destinations further away, an area is selected surrounding the vehicle location, the destination and the concrete route to the destination ("Corridor formation").

After storing the map data, the DVD with the map data can be taken out of the drive. Now, audio CDs can also be played.

If the driver deviates too far from the calculated route during the course of navigation system and thereby leaves the map area stored in the navigation processor, it may be necessary to insert the DVD again in order to calculate a new route. The navigation processor requests this automatically.

Location errors

The errors are classified into 2 categories:

- Incorrect position indication between 2 driving instructions (may not occur more than once every 500 km)
- Incorrect driving instruction (may not occur more than once every 1,000 km)

	Global positioning system location finding, function		**GF82.61-P-3007C**

MAP-SUPPORTED LOCATION FINDING, FUNCTION - GF82.61-P-3008GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

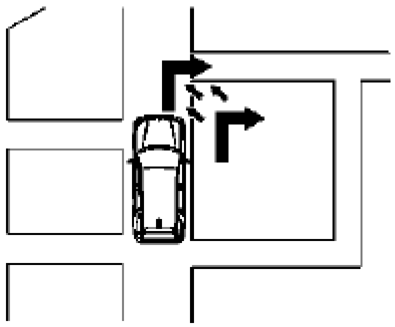
General

Map-supported location finding is available only in the digitized area of the CD-ROM map.

By comparing the calculated vehicle position with the **CD-ROM** map it is possible to recognize and automatically correct the deviation.

Function

The vehicle position is permanently followed by the **navigation processor** on the **CD-ROM** map. If the route deviates from the calculated route the position coordinates of the basic location finding are corrected if necessary.



P82.61-2541-01

Fig. 51: Identifying Map-Supported Location Finding Function

	Basic location finding, function		**GF82.61-P-3006GI**
	Global positioning system location finding, function		**GF82.61-P-3007GI**
	Guidance, function		**GF82.61-P-3012GI**
	Radio and navigation module, location/purpose/ design/function		**GF82.61-P-4109GI**

ROUTE CALCULATION, FUNCTION - GF82.61-P-3011E

MODEL 163, 168, 170, 203.0 /2 /7, 208, 209.3 /4, 210 with CODE (353) Audio 30 APS

Once the destination is entered into the radio (A2) the route is calculated by the integrated navigation processor and constantly updated. This can only be calculated within the digitalized map areas. The calculated route is the prerequisite of the destination guidance system.

Route calculation, function

The navigation processor calculates the route based on the entered destination and with the aid of the DVD map data while constantly finding the location. In the calculation, it takes into account the roads and attributes available on the DVD card and their attributes, such as one-way streets, bans on turns, road classes, etc. (where present).

Additionally, it is possible for the operator to indicate how the route is to be calculated:

- Fastest route
- Shortest route
- Own adjustments

In the event of "OWN ADJUSTMENTS", the following stretches can be blocked from the route calculation:

- FREEWAY

- FERRY
- TOLL

After calculation of the route, the navigation processor makes up a list of the streets along the route. This route list is used for navigation. It can be displayed during navigation by pressing the "I" (INFO) and "RTE" (Route) buttons.

Route updating

If the driver deviates from the calculated route, a new route list is automatically calculated by the navigation processor. The current position and the direction of travel are taken into consideration, and the new route is optimized accordingly. This is accomplished without any message on the display.

Circumventing traffic jams with "Traffic jam" menu key function

After a traffic jam is reported on traffic radio and before reaching the affected section, a route can be calculated for driving around the traffic jam. For this purpose, activate the "Traffic jam" menu and enter the length of the traffic jam including the distance to the start of the traffic jam.

The "Traffic jam" function is also available for Federal and State highways as well as for inner city areas.

Trips outside the digitized map area

If the vehicle leaves the digitized DVD map area (e.g. driving into a multi-level car park), then no route can be calculated or updated. "OFF ROAD" appears on the display. Upon leaving the map boundary, the display "OFF MAP" appears.

Destinations which lie outside of the digitalized map area cannot be taken into consideration on calculation of the route.

	Destination guidance, function		**GF82.61-P-3012D**

ROUTE CALCULATION, FUNCTION - GF82.61-P-3011GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

The route is calculated and updated continuously by the navigation processor after entering the destination on the **radio and navigation module (A2/56)** It can only be calculated within the digitized map area. The calculated route is the prerequisite of the **guidance system** .

Route calculation

The **navigation processor** calculates the route with the aid of the **CD-ROM** map data, the entered destination

and the momentary position. When calculating it considers the roads and attributes such as one-way streets, turning prohibitions, street classes,....(if present) read in from the **CD-ROM** map. Thereby it is possible for the user to determine in which way the route is to be calculated:

- **Maximize freeways**
- **Shortest route**
- **Minimize freeways**
- **Minimize toll roads**

Following route calculation the **navigation processor** sets up a list of the roads and junctions to be taken. This route list is used for guidance. It can be displayed by calling up the menu " **LIST** ".

- Route updating

  If the driver deviates from the calculated route, a new route list is calculated by the **navigation processor. The current position and the direction of travel are taken into consideration, and the new route is optimized accordingly. If the driver wants to deviate from the route, the calculation processor calculates a new route by pressing the multifunction key "DETR** " (detour).

On freeways the newly calculated route starts within approx. **5 miles** and on highways within approx. **1 mile** ".

- Detouring traffic jams, construction sites with "**Avoid Road** " function.

  When approaching a traffic jam, a construction site etc., it is possible to set up a new route calculation detouring the hindrance before the reaching the corresponding route section.

For this purpose press" **NAVI MENU** " button. Select "Route" with the aid of the" joystick " and then select" **Avoid Road** ". Select road to be avoided in the list displayed then.

If more roads are to be avoided proceed with " **Continue to Avoid Roads** ". If the newly calculated route is acceptable confirm with " **Reroute** ". Then confirm in " **Continue Trip to** " menu with Enter.

	Guidance, function		**GF82.61-P-3012GI**
	Radio and navigation module, location/purpose/ design/function		**GF82.61-P-4109GI**

DESTINATION GUIDANCE, FUNCTION - GF82.61-P-3012D

MODEL 163, 168, 170, 203.0 /2 /7, 208, 209.3 /4, 210 with CODE (353) Audio 30 APS

Digitized DVD map area

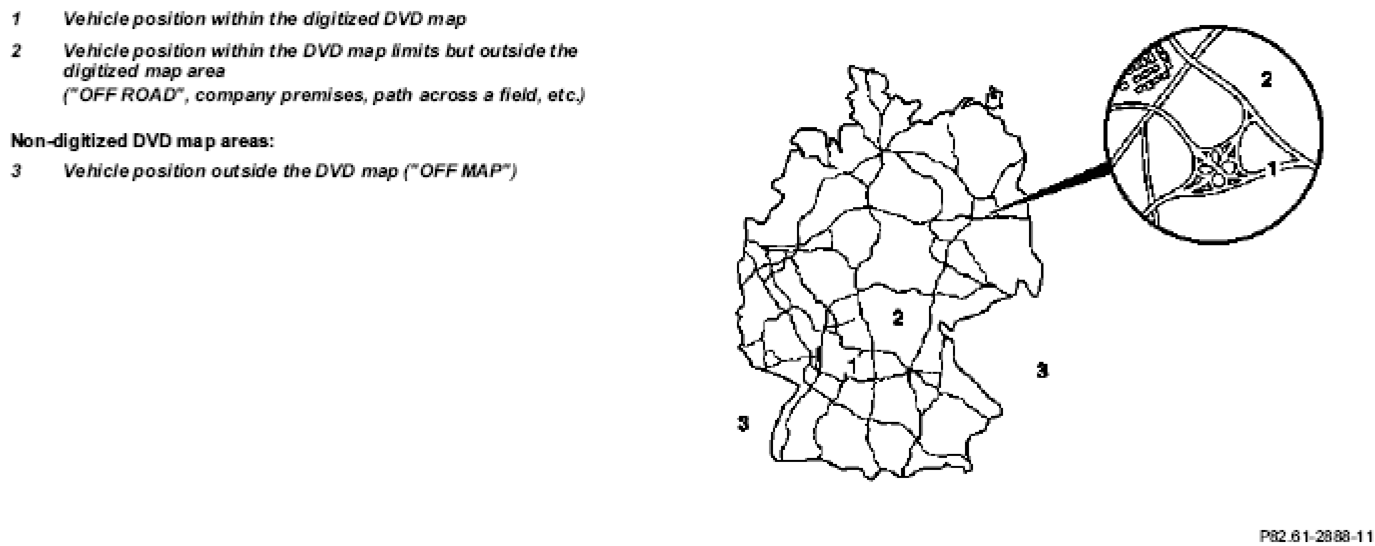


Fig. 52: Identifying Digitized DVD Map Area And Non-Digitized DVD Map Areas

Navigation is the generation and output of driving recommendations, in order to guide the driver to the desired destination. The prerequisites of destination guidance include:

- Constant map matching is in operation (occurs automatically),
- Destination was entered
- Route has been calculated.

The navigation processor continuously compares the route calculation data with the ongoing location finding data and derives from this measures for further navigation.

[i] The navigation processor is integrated in the radio (A2).

Depending on the vehicle position, a distinction is made between the following navigation modes:

- Destination within digitized DVD map area
- Restricted navigation outside the digitalized DVD map area

	Destination guidance in digitalized map area, function		**GF82.61-P-4000C**

GUIDANCE, FUNCTION - GF82.61-P-3012GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

Digitized and non digitized CD-ROM map areas

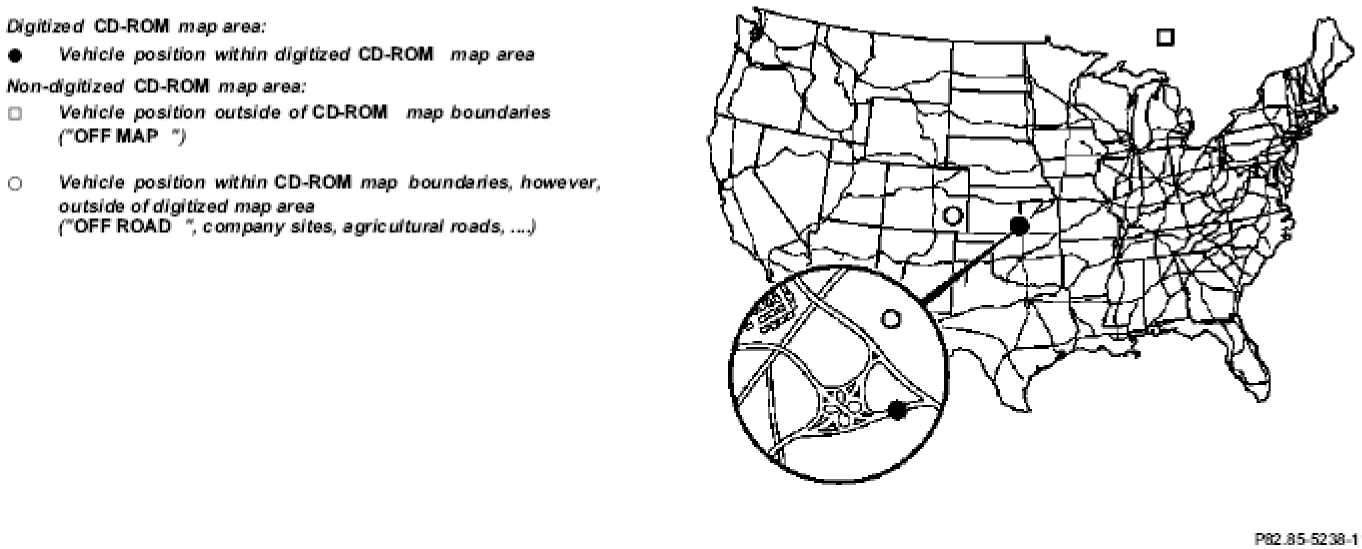


Fig. 53: Identifying Digitized And Non Digitized CD-ROM Map Areas

The road network is indicated in extremely simplified form.

Guidance is the generation and output of driving recommendations, in order to guide the driver to the desired destination. The prerequisites for route guidance are:

- Permanent location finding is in operation (is accomplished automatically),
- destination has been entered and
- the route has been calculated.

The **navigation processor** permanently compares the data from route calculation with the data from permanent location finding using this information for measures for further **guidance** . Two route guidance operating modes can be distinguished depending on the vehicle position (see figure):

- Guidance **within** the digitized **CD-ROM** map area.
- Limited guidance **outside** of the digitized **CD-ROM** map area.

	Guidance in digitized map area, function		**GF82.61-P-4000GI**
	Guidance in non-digitized map area, function		**GF82.61-P-4001GI**

DESTINATION GUIDANCE IN DIGITALIZED MAP AREA, FUNCTION - GF82.61-P-4000C

MODEL 163, 168, 170, 203.0 /2 /7, 208, 209.3 /4, 210 with CODE (353) Audio 30 APS

Display layout of the radio (A2) during navigation, shown on model 203

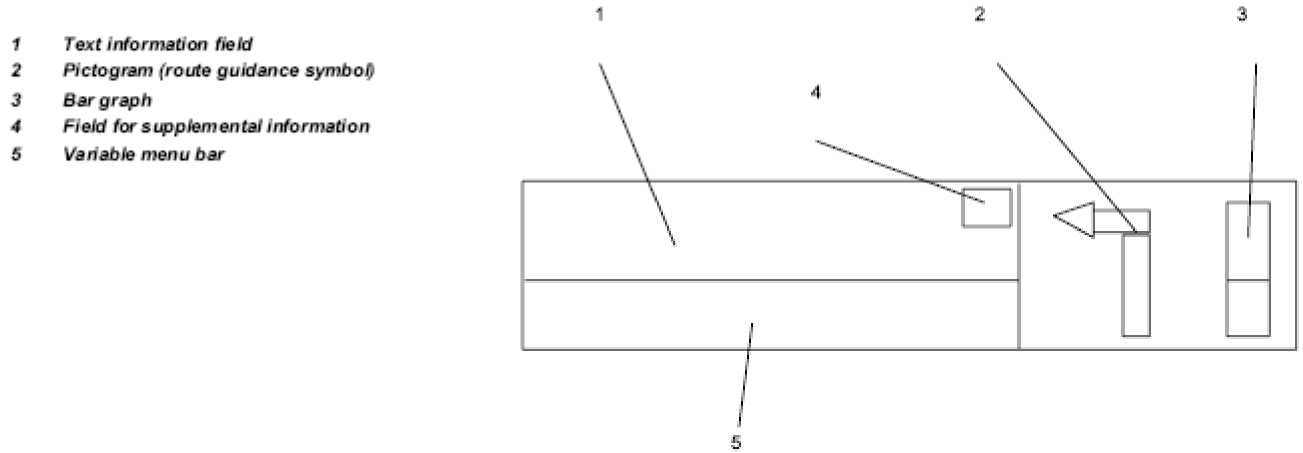


Fig. 54: Display Layout Of Radio (A2) During Navigation - Shown On Model 203

When traveling within the digitized map area, the following information calculated by the navigation processor is available to the user (partially to be called with "I" (INFO) button):

- Route list indicating the distance to be driven on the affected streets or roads
- Distance to destination and estimated time of arrival (the time must be set correctly for this purpose).
- Driving recommendations
- Arrow indicating the driving direction
- Current location, in other words name of city and street, latitude and longitude
- Name of the next road into which the vehicle should turn
- Distance to next turning point specified in units of length or as bar graph (3)

The navigation processor generates graphic signals for the navigation system symbols.

Actual route guidance is supported by voice output via the vehicle loudspeakers.

	Destination guidance in non-digitalized map area, function		GF82.61-P-4001C

GUIDANCE IN DIGITIZED MAP AREA, FUNCTION - GF82.61-P-4000GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

When driving within the digitized map area the following information is available to the user:

- Current position and vehicle route on digital map (illustrated in figure)
- Distance from destination and anticipated time of arrival

- Driving direction recommendation
- Distance to next turning point (specified in units of length)

The data is determined by the navigation processor and transmitted to the **radio and navigation module (A2/56)** The current route guidance is primarily supported by the **voice output** (English).

i The scale of the displayed map can be changed in increments. In addition it is possible to select whether the map is aligned in the direction of motion **Head-Up**) or toward the north **North-Up**). The graphical signals for map illustration is generated by the navigation processor.

	Voice output, function		**GF82.85-P-3001GI**
	Guidance in non-digitized map area, function		**GF82.61-P-4001GI**

DESTINATION GUIDANCE IN NON-DIGITALIZED MAP AREA, FUNCTION - GF82.61-P-4001C

MODEL 163, 168, 170, 203.0 /2 /7, 208, 209.3 /4, 210 with CODE (353) Audio 30 APS

When traveling outside of the digitized map area (e.g. company grounds, parking buildings, dirt roads,...), however still within the DVD map boundaries, the navigation processor switches over to "navigation system in non-digitized map area".

On the radio (A2) display the following message appears:

- "OFF ROAD"

If the vehicle is also outside the DVD map limit, the following message appears:

- "OFF MAP"

In both cases, only basic location finding is accomplished with correction using the GPS data.

A (limited) route guidance can be conducted only with specification of the:

- Distance from the destination as the crow flies
- Direction to the destination (as an arrow)

After reentering the digitized map area, the system automatically continues with "navigation system in digitized map area". The possible streets/roads on which the vehicle may be located are determined with the aid of GPS location finding. During this process a slight delay in the route guidance may result.

i The road data of several Central European countries are stored on the navigation DVD, so that the "OFF MAP" message will not appear, if borders between the stored countries are crossed. No special foreign country DVD has to be inserted.

	Dynamic route guidance, function		GF82.61-P-4003QA

GUIDANCE IN NON-DIGITIZED MAP AREA, FUNCTION - GF82.61-P-4001GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

When traveling outside of the digitized map area (e.g. company grounds, parking buildings, dirt roads,...), however still within the CD-ROM map boundaries, the **navigation processor** switches over to " **Guidance in non-digitized map area** " .

The following message appears on the display of the **radio and navigation module (A2/56)** :

"OFF ROAD "

In this case only basic location finding (dead reckoning) with correction by the **GPS** data is performed (**no map matching**)

After reentering the digitized map area, the system automatically continues with " **Guidance in digitized map area** ".

With the aid of the **GPS** position the possible roads, on which the vehicle could be located, are determined. However, this can result in temporary delays in the guidance function.

	Basic location finding, function		GF82.61-P-3006GI
	Global positioning system location finding, function		GF82.61-P-3007GI
	Guidance in digitized map area, function		GF82.61-P-4000GI

DYNAMIC ROUTE GUIDANCE, FUNCTION - GF82.61-P-4003GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

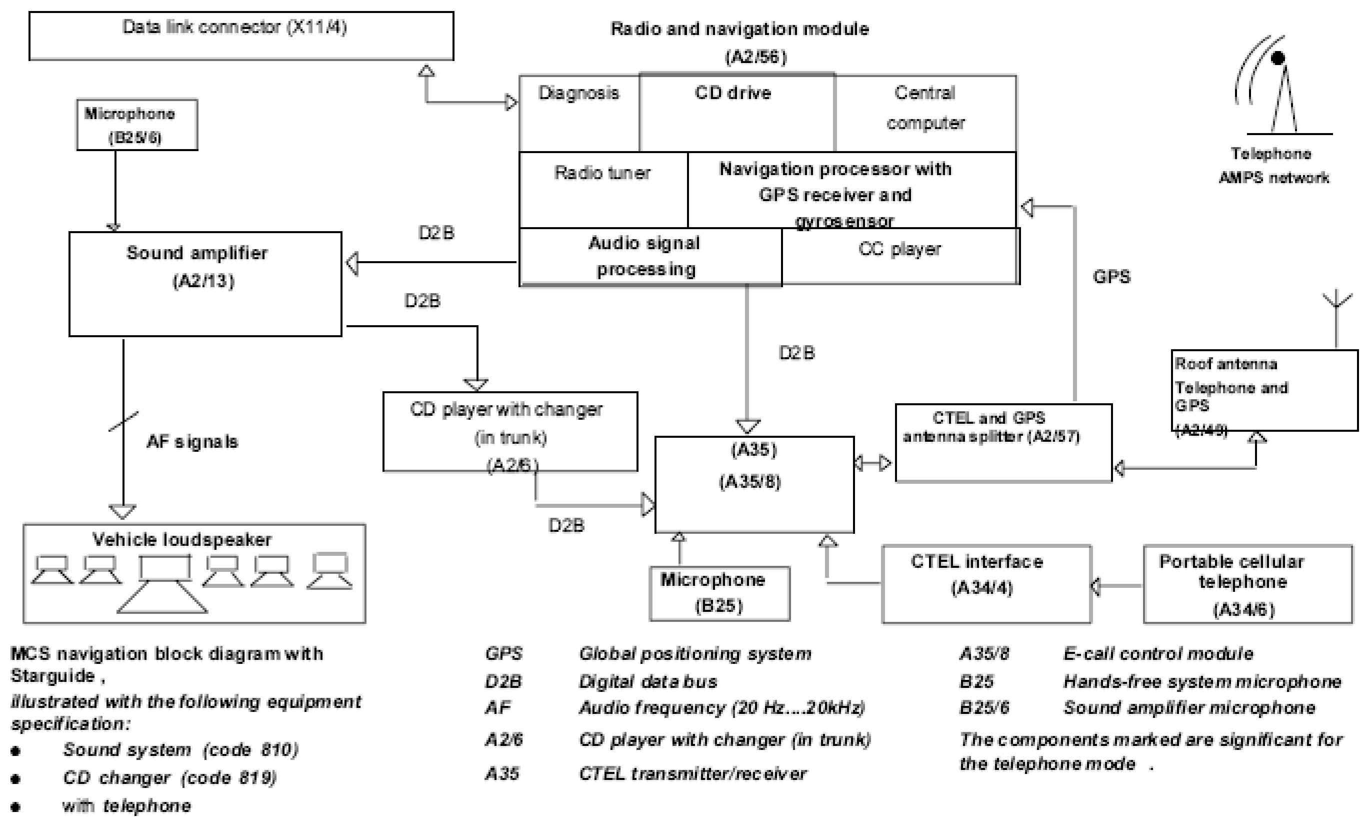


Fig. 55: Identifying Dynamic Route Guidance Function

Starguide was developed on the basis of **dynamic route guidance** in Europe. In order to comply with the more comprehensive USA requirements this system also contains an additional **Information Service** specially adapted to specific user requirements.

Dynamic route guidance

The desired requirements are transmitted to the **S** ervice **O** perating **C** enter (**SOC**). The Service **O** perating **C** enter (**SOC**) transmits the individual and relevant traffic situations to the vehicle in the greater metropolitan area of Los Angeles.

The current route guidance and the calculation of the dynamic route guidance is accomplished by the navigation processor in the **radio and navigation module (A2/56)**

Moreover, traffic jams and construction sites are indicated on the **radio and navigation module (A2/56) display in form of icons** .

-
-

ℹ The dynamic route guidance service will be tested in the Los Angeles area beginning in the summer of 2001.

	Starguide, function		GF82.85-P-2014GI
	Information service, function		GF82.85-P-3016GI
	Data transmission for Starguide, function		GF82.85-P-3017GI

DYNAMIC ROUTE GUIDANCE, FUNCTION - GF82.61-P-4003QA

MODEL 163, 168, 170, 203.0 /2 /7, 208, 209.3 /4, 210 with CODE (353) Audio 30 APS

The current traffic situation is taken into consideration in the dynamic route guidance. The COMAND navigation system Audio 30 APS can receive information on the traffic situation either by the Traffic Center Service (TCS) or the Traffic Message Channel (TMC).

i The services from the Traffic Center Service (TCS) are offered by an external provider and an application is to be sent to the provider for use.

Traffic messages via Traffic Center Service (TCS)

The latest traffic situation information is transmitted by a service provider for a fee in the form of an SMS (short message service) signal via the CTEL D network. The traffic data are only transmitted when the service provider receives a corresponding request from the vehicle.

The request can be sent either:

- Cyclically, every 15 minutes
- Once

In order to reduce the data volume the current location of the vehicle is automatically sent to the D network center when the information request is posted.

The service provider then transmits only traffic messages at within a radius of approx. 75 km of the vehicle. The telephone system of the vehicle receives the traffic announcements and transmits them via the D2B to the traffic data recorder that is integrated in the radio (A2).

i It is possible to use the telephone during TCS data interchange.

Traffic messages via Traffic Message Channel (TMC)

Information on the current traffic situation is transmitted by a specially equipped radio-broadcast station aimed at specific areas and coded (toll) or uncoded (toll free) via VHF. For this purpose an appropriate FM/ RDS station must be tuned in.

The radio (A2) receives the traffic announcements and transmits them to the traffic data recorder. Since no communication is accomplished between the vehicle and broadcasting corporation with TMC messages, the traffic data recorder selects the traffic messages related to the route on which the vehicle is presently driving as

well as the surrounding area.

Traffic information analysis

In both cases (TCS or TMC) the traffic data recorder decodes the traffic information and forwards it when requested to the navigation computer. The navigation processor makes the decision whether the route should be changed. If necessary, a message that the route should be changed is output via the vehicle speaker.

For synchronization purposes the traffic data recorder needs a list from the navigation processor, in which each stretch and each striking feature (e.g., freeway exit) of the recorded street network is clearly defined with the aid of a number. The list is originally stored on DVD. If required (e.g. changing the DVD) it is automatically loaded into the traffic data recorder. The traffic information stored in the traffic data recorder is erased automatically after 0.5 hrs., max. 100 messages can be stored.

The decoded traffic messages are marked on the map using suitable symbols. They can also be displayed as clear text. To this end the "alternate route" button should be pressed and the "TRAFFIC INFO" menu activated.

	Radio/navigation unit location/task/design/ function	Models 163, 168, 170, 208, 210	**GF82.61-P-4109A**
		Model 209	GF82.61-P-4109QA
	Radio, location/task/design/function	Model 203	GF82.60-P-4109P
	Transmitter/receiver unit, location/task/design/ function	Model 203, 210 with code (853) MB standard telephone with code (855) TELE AID with code (930) taxi emergency call Model 209 with code (853) MB standard telephone with code (855) TELE AID	GF82.95-P-4300A
	Telephone interface, location/task/design/ function	Model 203, 209	GF82.70-P-3107Q

RADIO AND NAVIGATION UNIT, LOCATION - GF82.61-P-4109-01A

Models 163, 168, 170,208, 210 with code 353

A2/56 Radio and navigation unit

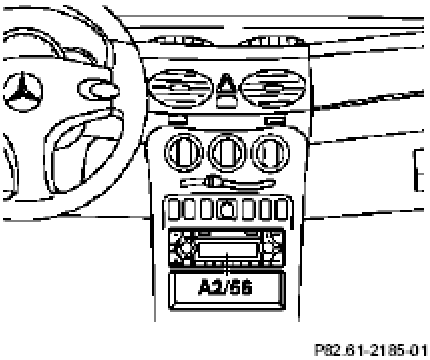


Fig. 56: Identifying Radio And Navigation Unit - Illustrated On Model 168

RADIO AND NAVIGATION MODULE, LOCATION - GF82.61-P-4109-01GI

A2/56 Radio and navigation module

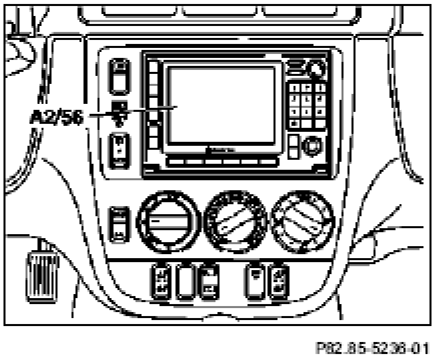


Fig. 57: Identifying Radio And Navigation Module - Radio And Navigation Module

RADIO/NAVIGATION MODULE, DESIGN - GF82.61-P-4109-03A

Models 163, 168, 170, 208, 209, 210 with code 353

The Audio 30 APS operating unit is a complete radio and navigation system.

It has:

- Radio/receiver with 2-tuner technology
- a signal input for audio mute
- Digital Data Bus interface (D2B)
- Display
- 4-channel amplifier with 4 speaker outputs
- CD ROM-disk drive for audio and navigation data CDs
- a navigation processor with integrated GPS receiver and gyro sensor
- Output of intermediate frequency signal (ZF) for the FM antenna diversity function
- Interface of interior CAN (CAN-B) and D2B (Digital Data Bus)

RADIO AND NAVIGATION MODULE, DESIGN - GF82.61-P-4109-03GI

The following is integrated into the radio and navigation module (A2/56) (maximum scope):

- Graphic compatible 5" LCD color display
- Navigation processor with GPS receiver and gyrosensor
- Single CD drive for playing audio CD's (option)
- Navigation CD drive for loading navigation data or for playing audio CD's (optional)
- Telephone unit (optional)
- Radio tuner
- Audio amplifier
- CC player

The **radio and navigation module (A2/56) has the following digital interfaces:**

- Digital data bus (D2B)
- K-cable (diagnosis interface)

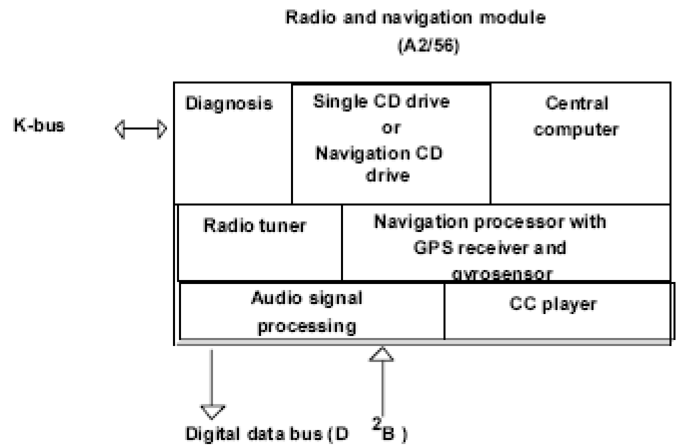


Fig. 58: Identifying Radio And Navigation Module (A2/56) Design

RADIO AND NAVIGATION MODULE, FUNCTION - GF82.61-P-4109-04A

Models 163, 168, 170, 208, 209, 210 with code 353

Processing key signals

The controls on the radio (A2) are read in via I/O ports of the microcontroller and made available to the central computer. Depending on the system function the button operations are processed further in the central computer or conveyed via the Digital Data Bus (D2B) or interior CAN (CAN B) in the form of a data telegram to the system components involved (e.g. CD changer).

Display

The display of the radios (A2) has 197 x 32 pixels. Texts are displayed in 3 lines.

After particular functions are called (e.g. navigation), the bottom line shows a variable inscription for the row of buttons underneath (multifunction buttons). As a result the system can be operated very conveniently with a few buttons, as the function which is activated when the button is operated, is shown in plain text (e.g. LANG, ITEM, DYN, CLOCK etc.).

Audio signal output

The audio signals of the various sources (CD, voice output for navigation etc.) are processed by the radio (A2) and amplified before output by the vehicle speakers.

i On models 168, 170, 208 and 210 with the sound system (code 810) the audio signals are finally amplified by the amplifier for the sound system (N40/3). For this, the audio source data (low-frequency signals) are transmitted to the amplifier for the sound system (N40/3) via separate lines.

i On models 163 and 209 the final amplification of the audio signal is performed by the sound amplifier (A2/13). All the data are transmitted via the D2B.

Audio mute

An incoming phone call activates the audio mute function (a separate signal input exists on the radio (A2) for this). When the audio mute function is activated, the current audio source (e.g. radio) is muted automatically.

Navigation processor, GPS control module and gyrosensor

The navigation processor is the central component of the navigation system.

It is integrated into the radio (A2) and from the incoming signals continuously calculates the location and once the destination is entered calculates the route for navigation. The GPS receiver is integrated into the navigation processor. It evaluates the satellite signals and calculates from them the vehicle position in degrees longitude and latitude. Various GPS antennae are used to receive these signals depending on the vehicle model:

- Model 163: telephone and GPS roof antenna (A2/49)
- Models 168, 208.3, 210: GPS antenna (A2/49a2)
- Models 170, 208.4: GPS rear antenna (A2/23a2)
- Model 209: GPS antenna (A2/23)

i Reception from at least 3 satellites is necessary for exact GPS position calculation. A free view of the sky is required for this purpose.

The integrated gyrosensor continuously senses every change in direction of the vehicle. Evaluation of this data is accomplished by the navigation processor.

i Calibration of the gyrosensor is not required.

DVD drive and DVD

The DVD drive of the radio (A2) reads data from the navigation DVD inserted and makes this available to the navigation processor via the data bus inside the device.

[i] Audio CDs can also be played.

The following are located on the navigation DVD:

- Program data for the navigation computer
- Voice segments for voice output
- Map data.

A distinction is made between digitized and non-digitized areas within the DVD map area:

- Villages, towns, roads, intersections and their attributes (e.g. one-way streets, no turns etc.) are recorded in the digitized map area.
- Included in the non-digitized areas are, for example company/private grounds, farms, small housing estates, tracks across fields and areas between villages.

No data is available here.

Diagnosis interface (K-line) and fault management of D2B-components

During operation, the system stores all occurring faults in the nonvolatile memory. It is not possible to output the fault via the display of the radio (A2).

The radio's (A2) fault management also includes the D2B-components connected. For this purpose, each D2B component has its own DTC memory. The faults are transmitted from the corresponding components via the D2B to the radio (A2) and can then be read out via the diagnosis interface

RADIO AND NAVIGATION MODULE, FUNCTION - GF82.61-P-4109-04GI

Processing button actuations

The control buttons and switches on the function keypad on the **radio and navigation module (A2/56)** are read in via the **I/O ports** of the microcontroller and transferred to the central processor. Depending on the system function the button actuations are processed in the central processor or relayed to the other system components via the digital data bus (D2B) in form of a data telegram.

Graphic preparation and image output

The graphics subsystem handles the preparation and output of the operating displays. The operating displays are output internally to the display by the graphic subsystem via the **RGB output** (**R** =red, **G** =green, **B** =blue).

The **RGB signal** contains information and amplitudes of the three basic colors **R** ed, **G** reen and **B** lue as well

as a synchronization signal. The electronic control in the display unit evaluates the **RGB signal** and actuates the individual pixels line by line according to color and intensity.

A horizontal synchronization pulse is output at the end of each line. The electronic circuitry of the display unit then starts the next line. After reaching the last line on the display, a vertical synchronization pulse is output and the electronic circuitry starts again with the first line.

Audio signal output

The audio signals from the various sources (CD, voice output for route guidance, ...) are processed by the radio and navigation module (A2/ **56) and amplified before output over the vehicle loudspeakers** . On vehicles with sound system (code 810) final amplification of the audio signals is accomplished by the **sound amplifier (A2/13)** . For this purpose audio source data is transmitted to the sound amplifier (A2/13) via the digital data bus (**D2B**).

Diagnosis interface (K bus) and D2B component error management

During the **radio and navigation module (A2/56) mode** the system stores all errors which occur in the non-volatile memory. These errors can then be read out on the diagnostic interface (K bus) with **Star diagnosis** . Output of the errors on the display unit is not possible.

Error management also includes components connected to the digital data bus (**D2B**).

Each **D2B component has its own DTC memory** . The errors are transmitted to the radio and navigation module (A2/56) via the digital data bus (D2B) on request by STAR diagnosis and can then be read out with the diagnostic interface.

Navigation processor and GPS control module

The **navigation processor** is the central component of the **radio and navigation module (A2/56)** . It is integrated into the **radio and navigation module (A2/56)** and calculates the location and vehicle route from the incoming signals after entering the route.

The **GPS control module** is a part of the navigation processor. It evaluates the satellite signals distributed by the **CTEL/GPS roof antenna (A2/49)** and the **CTEL and GPS antenna splitter (A2/57)** and calculates with this information the vehicle position.

CD-ROM and CD drive

With the aid of the **navigation CD drive** it is possible to read data from the special **navigation CD** or play **audio CD's or play** .

The following is stored on the **navigation CD-ROM** :

- Program data for execution in navigation processor
- Voice data for voice output

- Map data.

The **digitized map area on the CD-ROM** contains towns, cities, streets, intersections and their attributes (e.g.: one-way streets, turn prohibitions, ...). It does not contain information about company and private ground, farms, housing estates and agricultural roads.

Gyrosensor

The gyrosensor determines the direction change of the vehicle. It is installed in the **navigation processor** . Calibration is not required.

RADIO AND NAVIGATION UNIT, LOCATION/PURPOSE/DESIGN/FUNCTION - GF82.61-P-4109A

MODEL 163,168,170, 208, 210 with CODE (353) Audio 30 APS

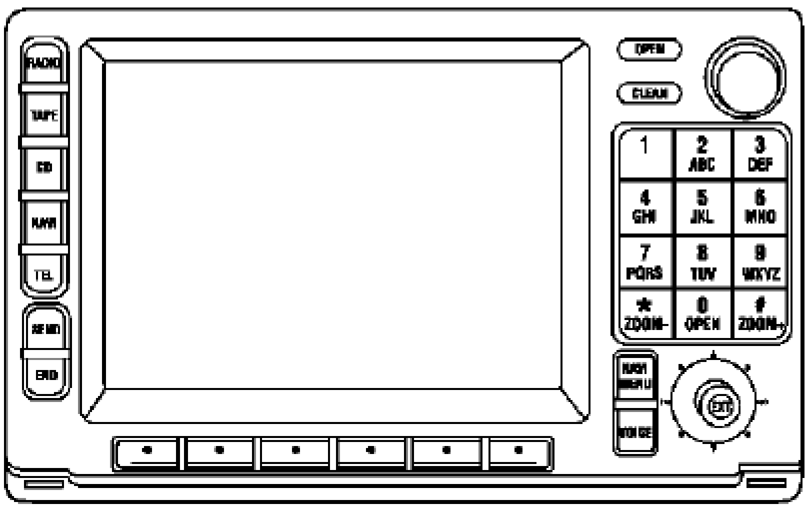


Fig. 59: Identifying Radio And Navigation Unit

	Radio and navigation unit, location		**GF82.61-P-4109-01A**
	Radio and navigation unit, purpose	• Radio reception and operation • Input/output and control unit for navigation • Amplification of audio signals • Control of integrated CD player and (optional) CD changer (A2/6)	
	Radio and navigation unit, design		**GF82.61-P-4109-03A**
	Radio and navigation unit, function		**GF82.61-P-4109-04A**

RADIO/NAVIGATION MODULE, LOCATION/PURPOSE/DESIGN/FUNCTION - GF82.61-P-4109GI

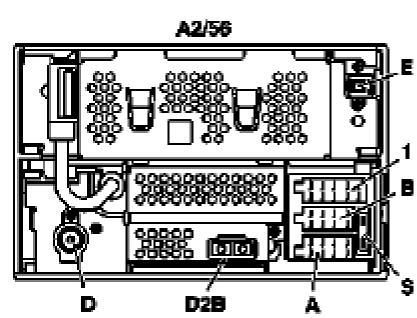
MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version



P82.85-4234-06

Fig. 60: Identifying Radio And Navigation Module

1	Connector 1 power supply for CD changer (A2/6, D2B wake-up line, ...)
A2/56	Radio and navigation module (illustrated on maximum version)
A	Connector A (power supply, K-bus,...)
B	Connector B (loudspeaker)
D	FM/AM antenna signal input
D2B	Interface to digital data bus
E	GPS antenna signal input
S	Equipment fuse



P82.85-5239-01

Fig. 61: Identifying Radio And Navigation Module Connectors

	Radio and navigation module, location		**GF82.61-P-4109-01GI**
	Radio and navigation module, purpose	Central control for the following systems: • Radio, CC player, CD player (optional) and	

		CD changer (optional) • Sound system (optional) • Navigation system (optional) • Telephone (optional)	
	Radio and navigation module, design		**GF82.61-P-4109-03GI**
	Radio and navigation module, function		**GF82.61-P-4109-04GI**

SURVEY OF SYSTEM COMPONENTS, AUDIO 30 APS, LOCATION/TASK/ DESIGN/FUNCTION - GF82.61-P-9998ZZ

MODELS 163, 168, 170, 203.0 /2 /7, 208, 209.3 /4, 210 with CODE (353) Audio 30 APS

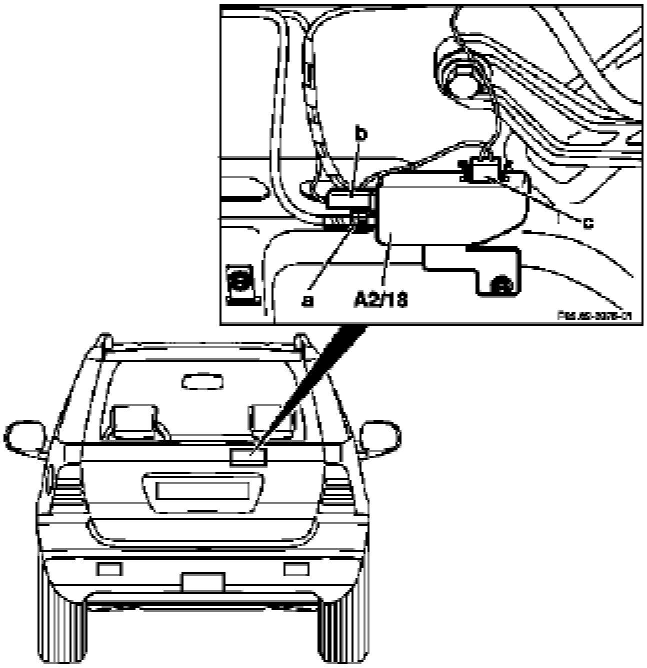
	Radio and navigation unit, location/task/design/ function	Model 163, 168, 170,208,210 Model 209	**GF82.61-P-4109A** GF82.61-P-4109QA
	Radio location/task/design/function	Model 203	GF82.60-P-4109P
	Additional fan for radio/navigation unit, location/ task	Model 203 as of 1.6.03	GF82.61-P-4110P
	FM/AM antenna amplifier, location/task/design/ function	Models 163, 168, 170, 208.4, 210.2 Models 208.3, 210 (except, 210.2) with code 352a	**GF82.62-P-4101A**
	Antenna amplifier module, location/task/design/ function	Models 203.0/7, 209.3 Model 203.2 Model 209.4	GF82.62-P-3105PP GF82.62-P-3105PS GF82.62-P-3105QA
	Rear window antenna, location/task/design/ function	Models 203.0/7, 209.3 Model 203.2	GF82.62-P-3106PP GF82.62-P-3106PS
	Windshield antenna, location/task/design/ function	Model 209.4	GF82.62-P-3112Q
	Radio reception antenna, location/task	Model 209.4	GF82.62-P-4103Q
	Radio reception amplifier, location/task	Model 209.4	GF82.62-P-4104Q
	Telephone antenna, location/task	Models 203.0/2/7, 209.3 Model 209.4	GF82.62-P-4105PP GF82.62-P-4105Q
	GPS/telephone roof antenna, location/task/ design/function	Models 163, 168, 208.3, 210	**GF82.70-P-4111A**

	Global positioning system antenna, location / task / design / function	Models 170, 208.4 Models 203.0/2/7, 209.3	GF82.61-P-4106A GF82.61-P-4106E
	Global positioning system antenna, location/ task	Model 209.4	GF82.61-P-4107Q
	Antenna splitter, location/task/design/function	Model 163	**GF82.85-P-3107B**
	CD player with changer, location/task/design/ function	Models 209.3/4 Models 203.0/2/7 with code (819) CD changer 6-disc Models 163, 208, 210 with code (819) CD changer 6-disc	GF82.64-P-3113Q GF82.64-P-3113PA **GF82.64-P-3113B**
	Sound amplifier, location/task/design/function	Models 209.3/4 with code (810) sound system Models 203.0/2/7 up to 23.4.04 with code (810) Sound system Models 203.0/2/7 as from 24.4.04 with code (810) sound system, except code (498) Japan version, except code (494a) USA version	GF82.62-P-3100Q GF82.62-P-3100PM
	Telephone interface, location/task/design/ function	Models 203.0/2/7, 209.3/4	GF82.70-P-3107Q
	Transmitter/receiver unit, location/task/design/ function	Models 203.0/2, 210 With code (853) MB Standard telephone With code (855) TELE AID With code (930) Taxi emergency call Models 203.7, 208.3, 209.3/4 With code (853) MB Standard telephone With code (855) TELE AID	GF82.95-P-4300A
	Table of contents, function description of Audio 30 APS		**GF82.61-P-0998ZZ**

ANTENNA SYSTEM (ATS) ARRANGEMENT OF COMPONENTS - GF82.62-P-0001-03D

Model 163

a	HF connection cable FM/AM amplifier - radio
b	Voltage supply from radio for FM/AM amplifier
c	Antenna signal cables
A2/18	FM/AM amplifier

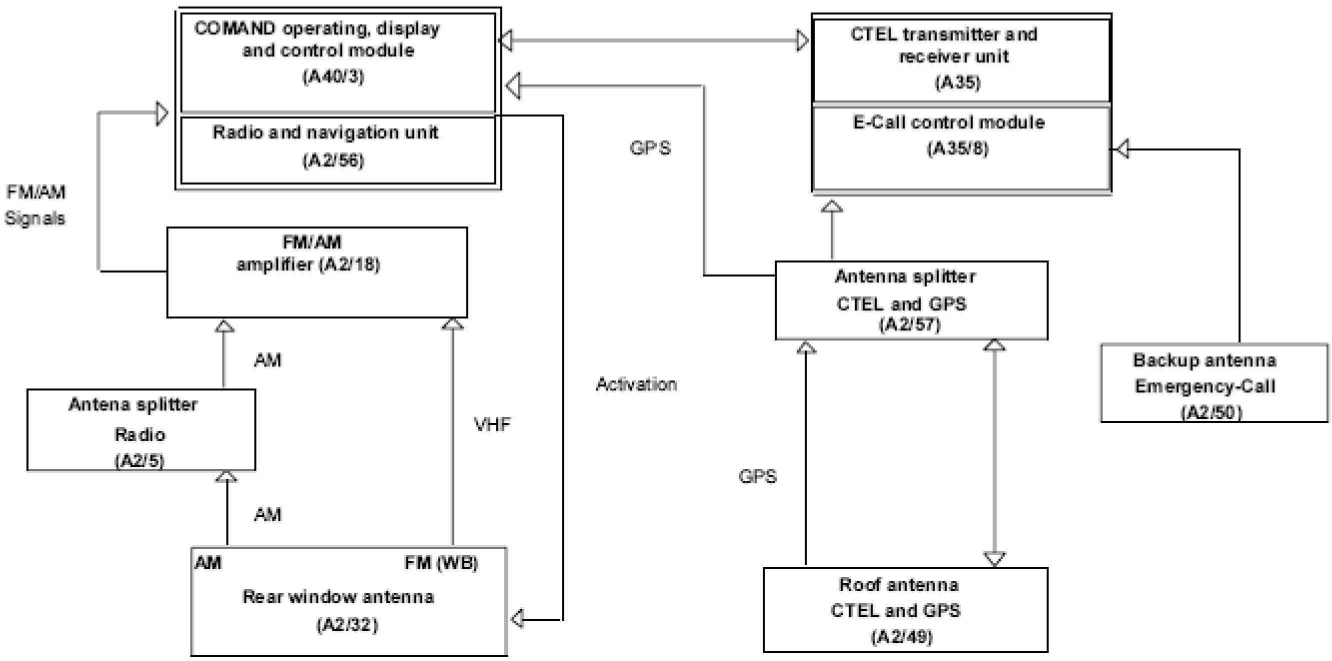


P82.62-0374-12

Fig. 62: Identifying Antenna System (ATS) Components Arrangement

ANTENNA SYSTEM (ATS), FUNCTION - GF82.62-P-0001GH

MODEL 163



Block diagrama antenna system up to 31.08.01

Shown with the following equipment :

- *COMAND operating and display system (code 352a)*

Abbreviations

AM	*AM frequency bands*
FM	*FM frequency band*
WB	*Weather band (only USA)*
GPS	*Global positioning system*

The components highlighted in gray are only for equipment and version (USA) (code 491):

E-Call (code 349)

Radio modular system (MCS) USA (Code 522)

Fig. 63: Identifying Antenna System Function - Block Diagram

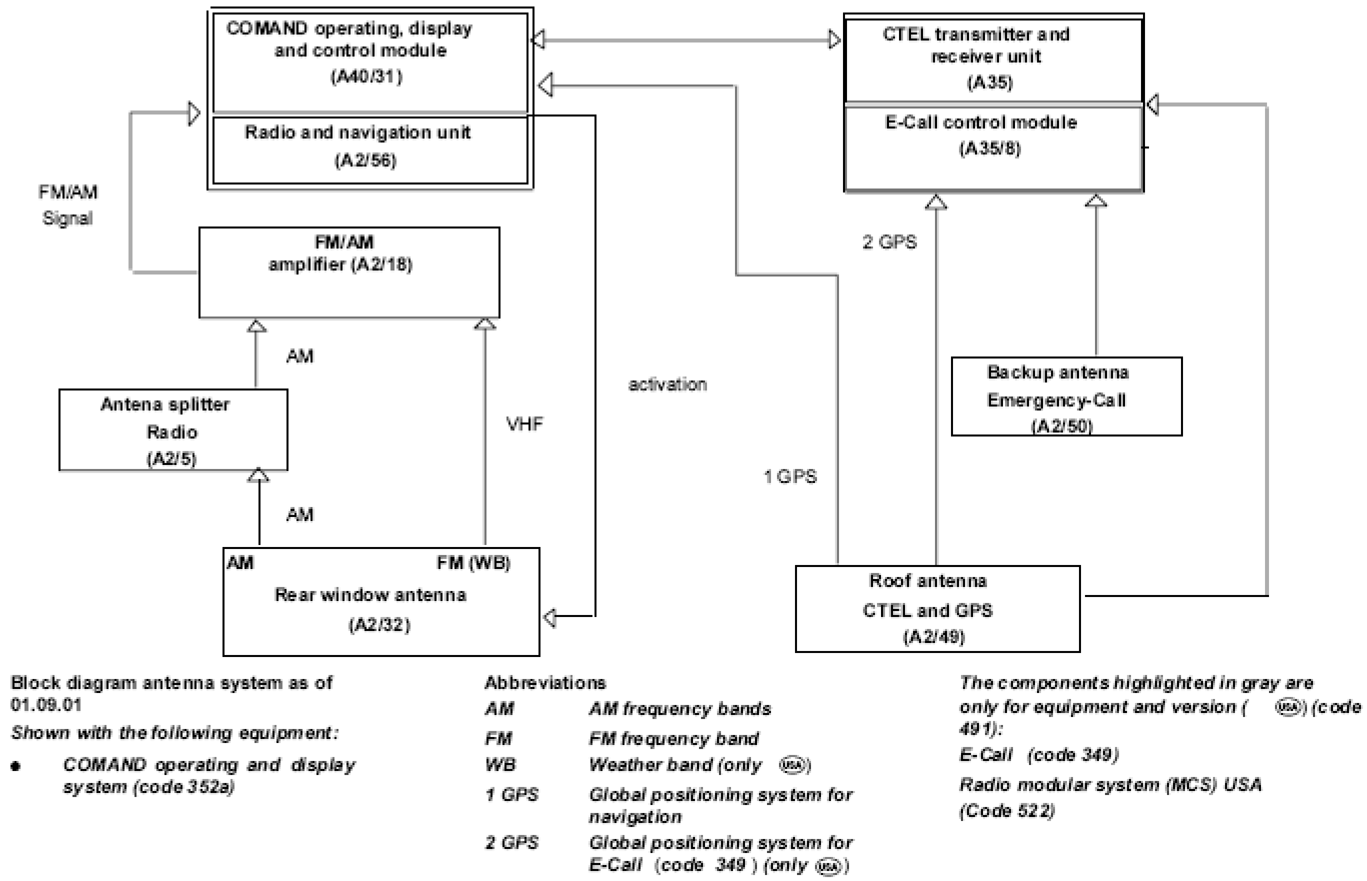


Fig. 64: Identifying Antenna System Block Diagram (01.09.01)

Preliminary remark

This description concerns mainly the audio, CTEL and navigation antenna system for vehicles fitted with COMAND or radio and navigation unit (MCS).

General

The different antennas are matched in terms of design to their specific reception and transmitting ranges.

A distinction must be made between passive and active antennas:

Passive antennas do not require a voltage supply, they can therefore not directly amplify the radio signal received.

Active antennas are supplied with voltage. They feature an integrated amplifier.

The voltage can be supplied over separate cables or over the coaxial cables over which the actual signals are transmitted **simultaneously (phantom feed)** . In this case, no separate **leads** are required **for the power supply** .

A further distinction in terms of the antennas is that certain antennas are used only for **reception** while others are used both for **reception** as well as for **transmission** .

Function up to 31.08.01

The **CTEL and GPS roof antenna (A2/49**) is supplied with direct voltage via the antenna cable (**phantom feed**).

It is connected by a coaxial cable to the **CTEL and GPS antenna splitter (A2/57)** . These two components ensure reception and transmission of the **GSM signals** and reception of the **GSP signals** .

Function as of 01.09.01

The **CTEL and GPS roof antenna (A2/49)** has the antenna splitter and an antenna amplifier integrated, which eliminates the need for the **CTEL and GPS antenna splitter (A2/57)** .

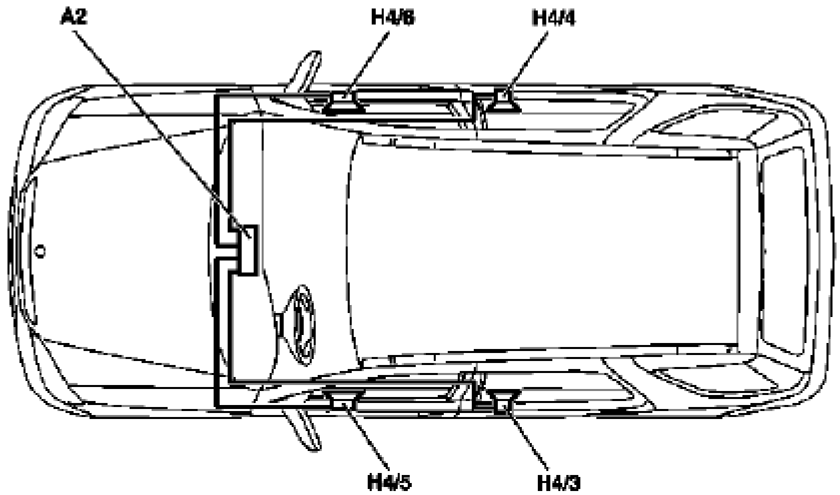
i The detailed descriptions of the individual systems and components are given in the reference documents listed below.

	Cockpit management and data system (COMAND) function		GF82.85-P-0003GH
	Modular control system (MCS), function		**GF82.85-P-0011GI**
	Rear window antenna, location/purpose/design/ function		**GF82.62-P-3106GH**
	FM/AM antenna amplifier, location/purpose/ design/function		**GF82.62-P-4101A**
	GPS/CTEL roof antenna, location/purpose/ design/function		**GF82.70-P-4111A**
	Antenna, location/purpose/design/function	Valid up to 31.08.01	**GF82.85-P-3107GH**

SPEAKER SYSTEM (LSA) ARRANGEMENT OF COMPONENTS - GF82.62-P-0002-01D

Model 163

A2	Radio
H4/3	Left rear door speaker
H4/4	Right rear door speaker
H4/5	Left front door speaker
H4/6	Right front door speaker



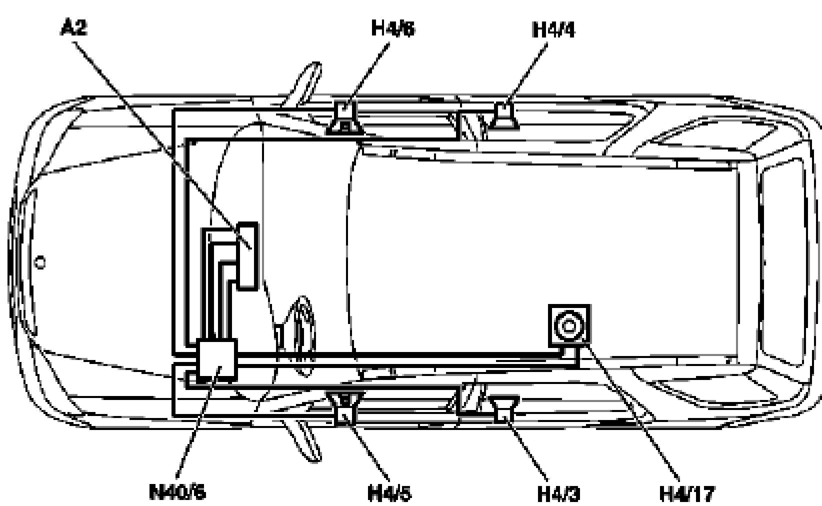
P82.62-0372-06

Fig. 65: Identifying Speaker System (LSA) Components Arrangement

SPEAKER SYSTEM (LSA), LOCATION OF COMPONENTS - GF82.62-P-0002-01E

Model 163 with sound system

A2	Radio
H4/3	Left rear door speaker
H4/4	Right rear door speaker
H4/5	Left front door speaker
H4/6	Right front door speaker
H4/17	Acoustimass bass module
N40/6	Amplifier control module (Radio/ speaker)



P82.62-0373-06

Fig. 66: Identifying Speaker System (LSA) Components Location

TABLE OF CONTENTS, FUNCTION DESCRIPTION OF ANTENNA SYSTEM (ATS) - GF82.62-P-0999GHZ

MODEL 163

	Antenna system (ATS), function		**GF82.62-P-0001GH**
	Survey of system components for antenna system (ATS), location/purpose/design/function		**GF82.62-P-9999GHZ**

SOUND AMPLIFIER, POSITION - GF82.62-P-3100-01GH

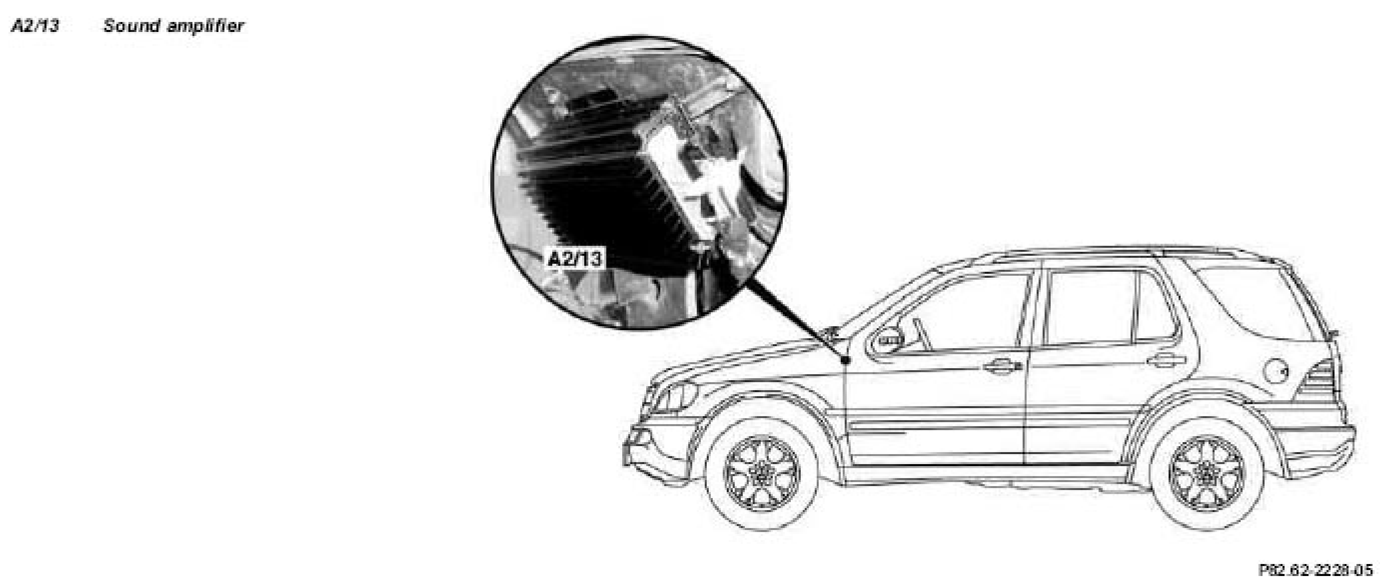


Fig. 67: Identifying Sound Amplifier Location

SOUND AMPLIFIER, FUNCTION - GF82.62-P-3100-04GH

The data interchange between the **sound amplifier (A2/13)** and the possible signal sources, e.g.:

- **Radio (A2)** or
- **COMAND operating, display and control module (A40/3)**

is performed via the digital databus (**D2B**). Here, both the control information and the signals from the audio sources (radio, CD, navigation voice command) are sent via the digital databus (**D2B**).

Signal processing

In order to make the diverse sound settings possible, the **sound amplifier (A2/13)** is equipped with a **D** igital **S** ignal **P** rocessor (**DSP**), which performs the entire signal filtering process. In comparison to conventional

analog filters, digital filters contain the following significant advantages:

- the filter parameters (sound settings) do not alter throughout the period, this thus means that all the settings can be repeated exactly
- low noise level
- the component outlay is significantly reduced, as the filter parameters are set by the software and not by varying component values (resistances, capacitances or inductance values), thus the number of possible filter settings is increased

Sound optimizations

Each of the six amplifier channels is equipped with an individual compensation, which can, when requested, rectify the vehicle's acoustics. In addition further sound optimization settings can be made and effects such as, e.g. 'voice emphasizing' or 'stereoscopic sound' invoked.

Bass, treble, volume, balance, fader and the dynamic loudness function can be individually set.

Noise suppression

The output level of the six 6 output stages is constantly monitored and regulated such that distortion is kept to a minimum.

Automatic Vehicle Noise Compensation (VNC))

With the aid of the **sound amplifier microphone (B25/6)** , which is connected directly to the **sound amplifier (A2/13)** , the noise level in the vehicle is measured. The volume of the music output signal is constantly adapted to this noise level. To this end the **sound amplifier (A2/13)** must be able to detect which of the measured signals are noise emissions from the moving vehicle and which are audio signals. This is conducted by comparing the output signal of the **sound amplifier (A2/13)** with the measured signal.

Put simply, the vehicle noise level is the difference between the two signals.

Diagnosis

The **sound amplifier (A2/13)** can set up the following messages which are relevant for the diagnosis:

- Operating status
- Undervoltage
- Internal fault in the **sound amplifier (A2/13)**

The messages are sent over the digital databus (**D2B**) to the **COMAND operating, display and control module (A40/3)** or the **radio (A2)** , and can be read out there over the (**K-wire**) diagnostics line.

SOUND AMPLIFIER, LOCATION/TASK/DESIGN/FUNCTION - GF82.62-P-3100GH

MODEL 163 with CODE (810) sound system

	Sound amplifier, position		**GF82.62-P-3100-01GH**
	Sound amplifier, task	Processing (sound settings) and amplification of all audio signals (radio, cassette, CD, navigation voice command,..)	
	Sound amplifier, design	• Digital databus interface (D2B) • Connection for **sound amplifier microphone (B25/6)** for automatic vehicle noise compensation • Digital filter technology • outputs distributed across following loudspeaker groups: • Treble • Medium treble • Medium bass • Bass These are distributed as follows: Left front Right front Left rear Rear right Center Woofer	
	Sound amplifier, function		**GF82.62-P-3100-04GH**

REAR WINDOW ANTENNAS, DESIGN - GF82.62-P-3106-03GH

Model 163

Antenna ranges

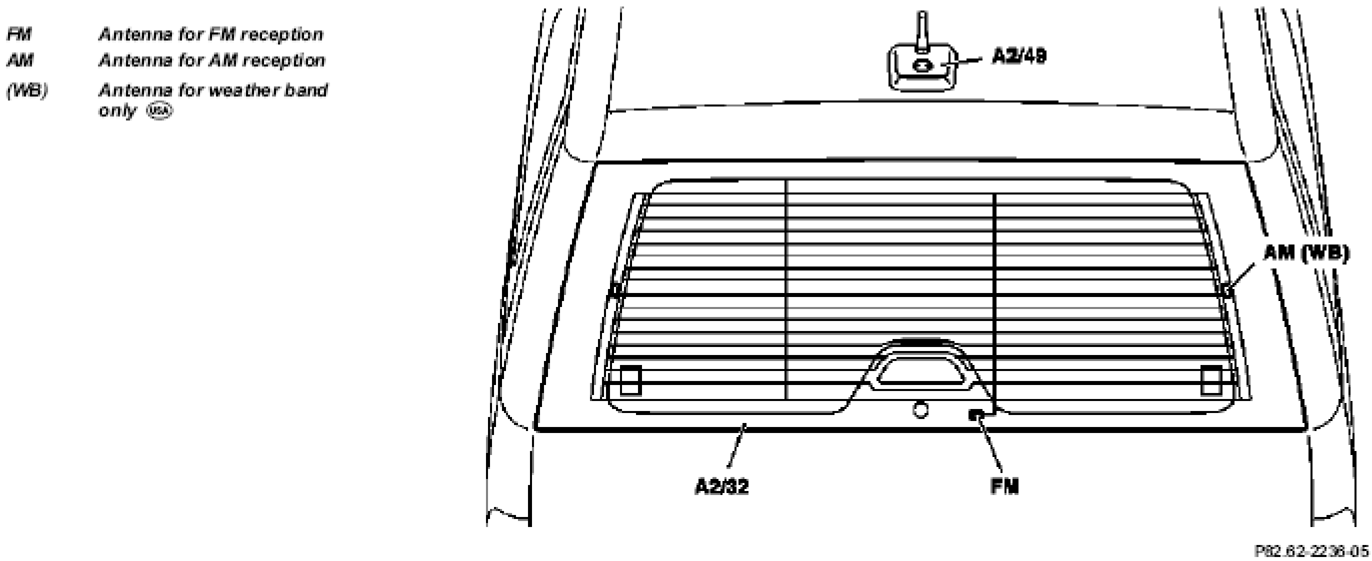


Fig. 68: Identifying Rear Window Antennas Design

The individual antennas are attached to the inner side of the rear window.

The **AM antenna** in some cases is part of the heating elements of the rear window defroster. The **AM signals** are decoupled by the **radio antenna splitter (A2/5)** .

All the antennas are matched in terms of their length and shape to the particular frequency band which they receive.

REAR WINDOW ANTENNAS, FUNCTION - GF82.62-P-3106-04GH

Model 163

Function:

The radio signals are received by the **rear window antenna (A2/32) (AM, FM**). The high-frequency **oscillations (RF)** of the electrical field in the air are converted into an electrical **alternating voltage** .

A standing electrical wave is formed in the antenna as a result of the correct matching of the length of the antenna to the wavelength of the frequency to be received.

In this case, the **amplitude** of the **RF signal** has a constant value at a random point of the antenna. The **RF signal level** is at the maximum at the connection point. A variation of the length of the antenna from its optimum length results in a reduction in the **RF signal level** at the antenna output. If the variation is too large, no further signal is received (for example if the antennas are incorrectly connected to the antenna amplifier).

REAR WINDOW ANTENNA, LOCATION/PURPOSE /DESIGN/FUNCTION - GF82.62-P-3106GH

MODEL 163

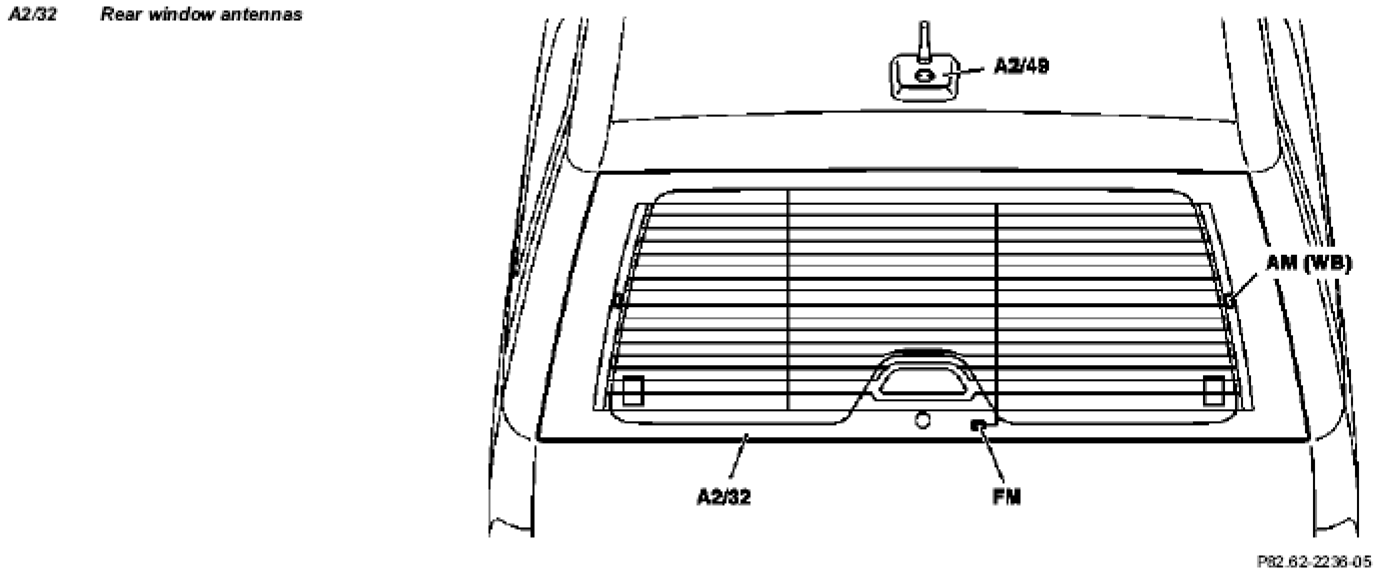


Fig. 69: Identifying Rear Window Antennas Location

	Rear window antennas, location	The antennas are located in the rear window	
	Rear window antennas, purpose	Reception of the following radio signals: • AM, FM (WB only USA)	
	Rear window antennas, design		**GF82.62-P-3106-03GH**
	Rear window antennas, function		**GF82.62-P-3106-04GH**

FM/AM ANTENNA AMPLIFIER, LOCATION - GF82.62-P-4101-01GH

Model 163

Location:

the FM/AM amplifier (A2/18) is located in the tailgate.

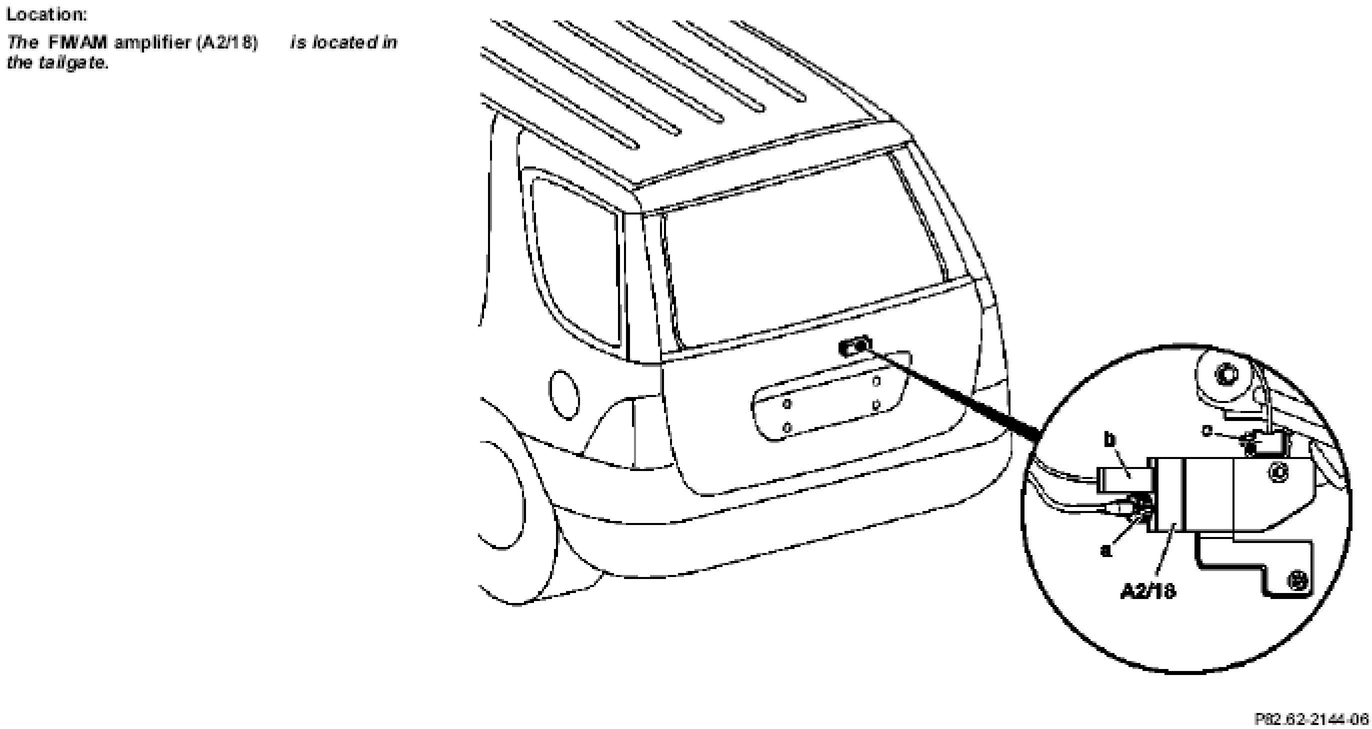


Fig. 70: Identifying FM/AM Antenna Amplifier Location

FM/AM ANTENNA AMPLIFIER, FUNCTION - GF82.62-P-4101-04GH

The radio signals are received by the **rear window antenna (A2/32)** and passed to the signal input of the **FM/AM amplifier (A2/18)** . This amplifies the signals and passes them over a coaxial cable to the receiver of the radio set of the audio unit.

FM/AM ANTENNA AMPLIFIER, LOCATION/PURPOSE/DESIGN/FUNCTION - GF82.62-P-4101A

MODEL 163, 168, 170, 208.4, 210.2

MODEL 208.3, 210 (except, 210.2) except CODE (352a) COMAND operating and display system

	FM/AM antenna amplifier, location	Model 168 Model 170 Model 208 Model 210 (except 210.2) Model 210.2 Model 163	GF82.62-P-4101-01A GF82.62-P-4101-01B GF82.62-P-4101-01D GF82.62-P-4101-01E GF82.62-P-4101-01C **GF82.62-P-4101-01GH**
	FM/AM antenna amplifier, purpose	Amplification of the FM/AM radio signals	
	FM/AM antenna	• Coaxial connection for	

	amplifier, design	signal outputs • Connections for power supply and signal inputs/outputs [i] If the voltage supply of the **FM/AM amplifier (A2/18)** fails, the **AM** signal path is interrupted. **FM** reception is possible with reduced reception quality.	
	FM/AM antenna amplifier, function		GF82.62-P-4101-04A
	FM/AM antenna amplifier, function	Model 163	**GF82.62-P-4101-04GH**

TELEPHONE ANTENNA, LOCATION - GF82.62-P-4105-01E

A2/22 Telephone antenna

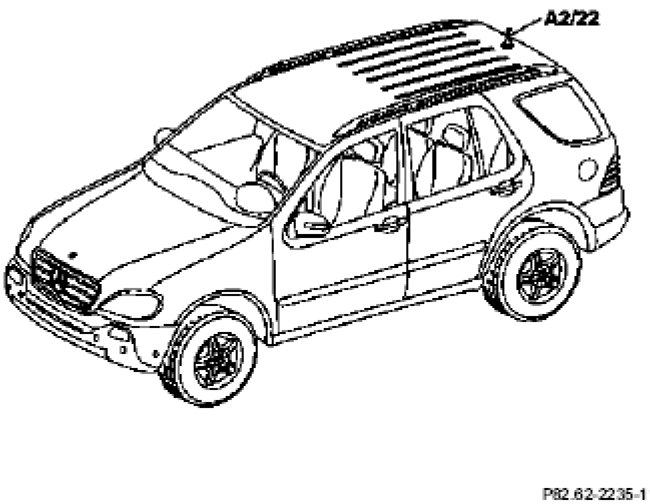


Fig. 71: Identifying Telephone Antenna

TELEPHONE ANTENNA, LOCATION/PURPOSE - GF82.62-P-4105GH

MODEL 163 with CODE (853) MB standard cellular telephone with CODE (854) MB portable cellular telephone

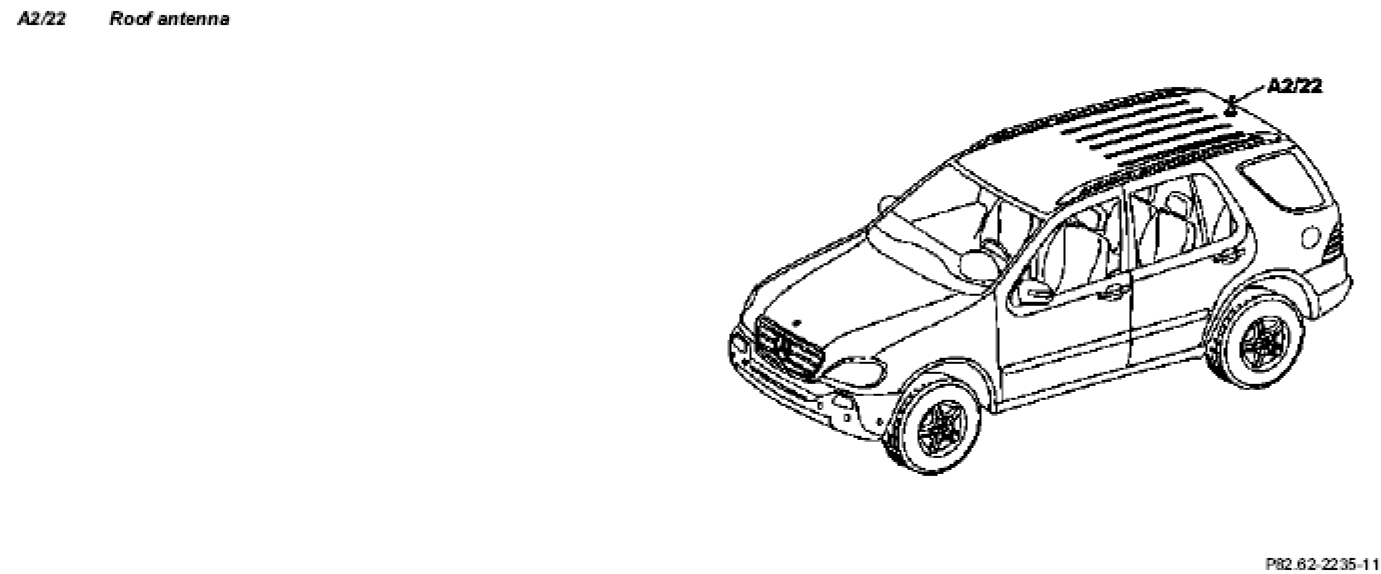


Fig. 72: Identifying Roof Antenna

	Telephone antenna, location	The **roof antenna (A2/22)** is located in the rear area of the vehicle roof.	
	Telephone antenna, purpose	• Conversion of electromagnetic radio waves into electrical voltages and vice versa • Transmitting/receiving telephone signals (data and voice output) • Lobar bundling of the transmission energy • Detecting the matching frequency range	

SURVEY OF SYSTEM COMPONENTS FOR ANTENNA SYSTEM (ATS), LOCATION/ TASK/DESIGN/FUNCTION - GF82.62-P-9999GHZ

MODEL 163 as of 1.9.01

	Rear window antenna, location/task/design/ function		**GF82.62-P-3106GH**
	FM/AM antenna amplifier, location/task/design/ function		**GF82.62-P-4101A**
	Telephone antenna, location/task		**GF82.62-P-4105GH**
	GPS/telephone roof antenna, location/task/ design/function		**GF82.70-P-4111A**
	E-Call backup antenna,		**GF82.95-P-4205GH**

	location/task		
	Contents - function description of antenna system (ATS)		**GF82.62-P-0999GHZ**

CD PLAYER WITH CHANGER, LOCATION - GF82.64-P-3113-01GI

The CD player with changer is located behind the access flap in the right side cover of the trunk.

A2/6 CD player with changer

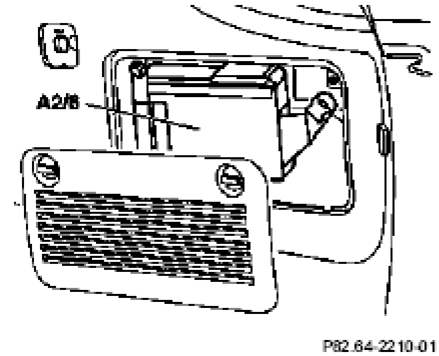


Fig. 73: Identifying CD Player With Changer Location

CD PLAYER WITH CHANGER, FUNCTION - GF82.64-P-3113-02GI

Controlling CD player

The **CD player with changer (in trunk) (A2/6)** is controlled by the **radio and navigation module (A2/56)** via the digital data bus (D2B).

The CD player generates reports on the following operating conditions:

- No magazine in CD changer
- Magazine assignment (only with music CD)
- Number of current CD
- Number of current title
- List of occupied slots (CDs)
- Title number per disc
- Current operating state (acoustic playback of radio signals, pause, etc.)

The messages are stored on the digital data bus **D2B**) and interpreted by the **radio and navigation module (A2/56)** .

CD playback

The audio data is stored digitally on the **CD-ROM** . The audio CD is driven by a motor in the **CD-player with changer (in trunk) (A2/6)** .

The laser-optical device scans the non-labeled side of the rotating **CD** without making contact and converts the digital optical signals into electrical signals. Small interruptions in the data flow of the laser optics caused by scratches or contamination on the **audio CD** are compensated by the **D/A converter** supplementing the missing values .

The electrical signals are then decoded in the **CD player with changer (in trunk) (A2/6)** and transmitted via the digital data bus (**D2B**) to the **radio and navigation module (A2/56)** via the audio signal processing or when the **sound amplifier (A2/13)** (code 810) is installed to the loudspeakers.

Jumps and interruptions during playback

On **bad roads or in the event of heavy vibrations** , jumps and interruptions can occur during playback. In such cases do not start **CD mode** until better road conditions are present.

In the event of wet weather conditions and strong deviations in the ambient temperatures moisture can collect in the CD player housing (condensation formation). This could also lead to malfunctions in the playback. In such cases provide for sufficient ventilation of the **CD player** and the trunk.

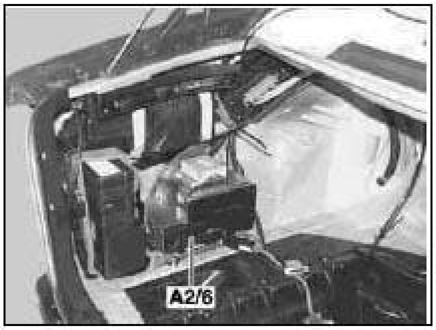
CD PLAYER WITH CHANGER, LOCATION/TASK/DESIGN/FUNCTION - GF82.64-P-3113B

MODELS 163, 208, 210, 215, 220 with CODE (819) 6-disc CD changer

MODELS 208, 210, 215, 220 with CODE (819a) CD changer with CODE (498) Japanese version

Shown on model 220 (as of 1.9.02)

A2/6 CD changer (in trunk)



P82.64-2405-01

Fig. 74: Identifying CD Changer (In Trunk) Location

	CD player with changer, location	The CD player with changer (in the trunk) (A2/6) is located in the trunk near the left side wall.	
		Model 163	**GF82.64-P-3113-01GI**
		Models 208, 210	GF82.64-P-3113-01D
		Models 215, 220 with	GF82.64-P-3113-01F

		code 498 Models 215, 220 without code 498	GF82.64-P-3113-01E
	CD player with changer, purpose	• Playing audio compact discs (CD) • Changing CDs contained in the magazine	
	CD player with changer, design	• 6-slot CD changer magazine (J) only: 12-slot CD changer magazine • Digital Data Bus (D2B) interface The factory planned installation position for the CD changer is vertical, whereby other installation positions are possible by adaptation of the spring locations.	
	CD player with changer, function	Models 208, 210 Model 215, 220	GF82.64-P-3113-02C GF82.64-P-3113-02B

CD PLAYER WITH CHANGER, LOCATION/PURPOSE/DESIGN/FUNCTION - GF82.64-P-3113GI

MODEL 163 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (819) 6-disk CD changer in trunk with CODE (491) U.S. version

A2/6 CD player with changer

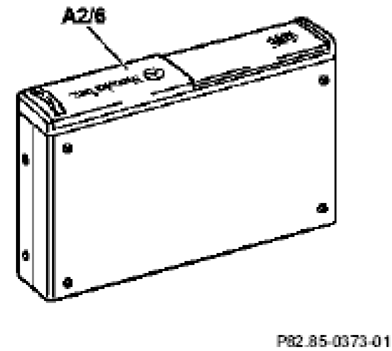


Fig. 75: Identifying CD Player With Changer

	CD player with changer, location		**GF82.64-P-3113-01GI**
	CD player with changer, purpose	• Playing audio compact discs (CD). • Changing CD's contained in the magazine	
	CD player with changer, design	• CD changer magazine for 6 CD's • Digital data bus (D2B) interface The installation position of the CD changer predefined by the factory is vertical, however another installation location is also possible by adapting the spring location	
	CD player with changer, function		**GF82.64-P-3113-02GI**

GPS/CTEL ROOF ANTENNA, LOCATION - GF82.70-P-4111-01GH

Model 163

Location, illustration valid up to 31.08.01:

The CTEL and GPS roof antenna (A2/49) is mounted on the rear of the roof in the middle of the vehicle.

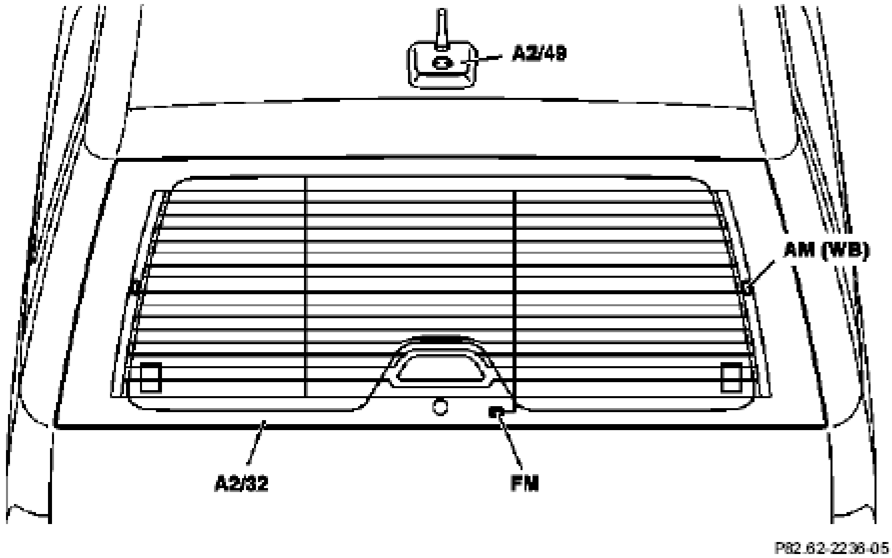


Fig. 76: Identifying CTEL And GPS Roof Antenna (31.08.01)

Location, illustration valid as of 01.09.01:

The CTEL and GPS roof antenna (A2/49) is mounted in the rear area of the vehicle roof.

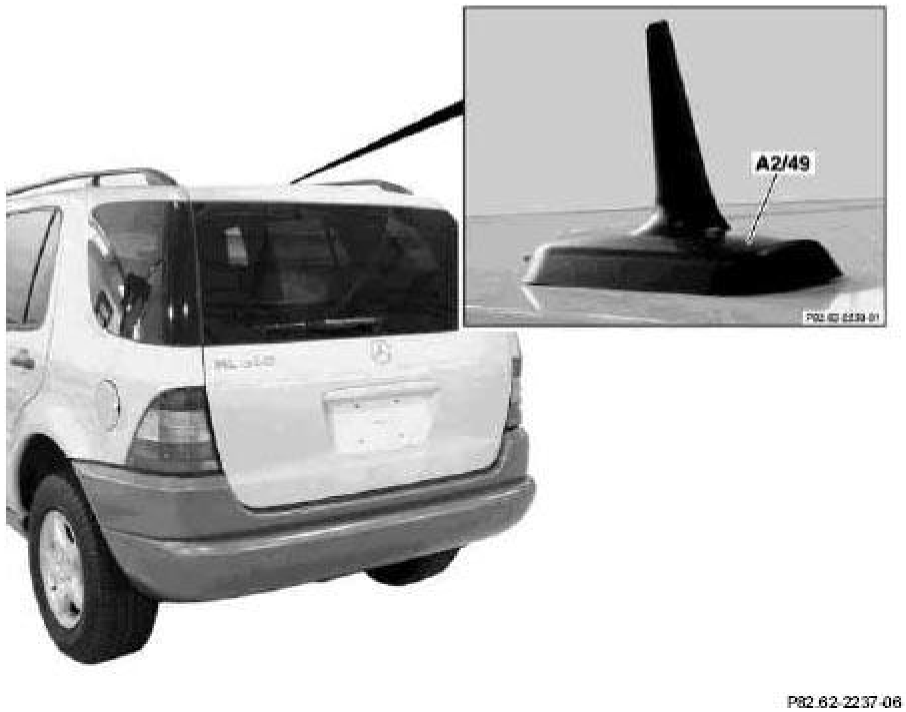


Fig. 77: Identifying CTEL And GPS Roof Antenna (01.09.01)

Illustration shows model 163 up to 31.8.01 :

A2/49 CTEL and GPS roof antenna

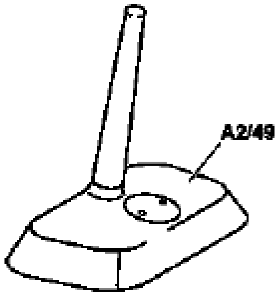


Fig. 78: Identifying CTEL And GPS Roof Antenna (31.8.01)

Illustration shows model 163 as of 01.9.01 :

A2/49 CTEL and GPS roof antenna

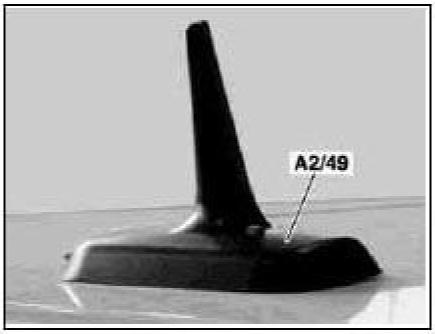


Fig. 79: Identifying CTEL And GPS Roof Antenna (01.9.01)

GPS/CTEL ROOF ANTENNA, DESIGN - GF82.70-P-4111-03GH

Model 163 as of 01.9.01

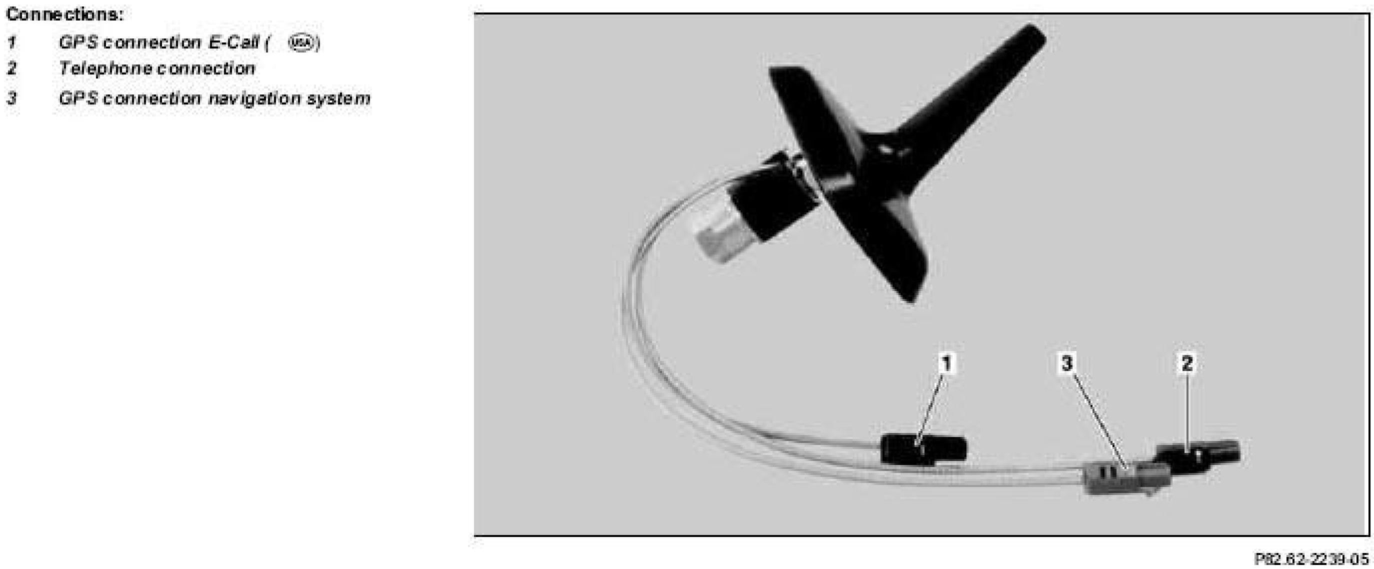


Fig. 80: Identifying GPS/CTEL Roof Antenna Design

GPS/CTEL ROOF ANTENNA, FUNCTION - GF82.70-P-4111-04D

Model 163 with code 353

CTEL and GPS roof antenna (A2/49)

The **CTEL and GPS roof antenna (A2/49)** is a combination antenna for the telephone and GPS.

The integrated **GPS antenna (A2/49a2)** receives the GPS satellite signals. This antenna does not transmit signals.

The integrated **CTEL antenna (A2/49a1)** receives and transmits GSM radio signals.

The CTEL and GPS radio signals are transmitted to an antenna socket used by both. For this reason only one antenna cable is required.

The **CTEL and GPS roof antenna (A2/49)** is an active antenna. It is supplied with DC power via the antenna cable (phantom feed). The electronic circuitry in the antenna must ensure that

- the telephone transmitter signals are only transmitted to the **CTEL antenna (A2/49a1)** .
- the signals received by both antennas are available at an antenna output.

The antenna is connected to the **CTEL and GPS antenna splitter (A2/57)** by a coaxial cable.

GPS/CTEL ROOF ANTENNA, FUNCTION - GF82.70-P-4111-04GH

Model 163

Function up to 31.8.01

The **GPS/CTEL roof antenna (A2/49)** is a combination antenna for telephone and GPS.

The **CTEL and GPS roof antenna (A2/49)** receives the **GPS** satellite signals. No **GPS** signals are transmitted over this range of the antenna.

The **CTEL and GPS roof antenna (A2/49)** receives and transmits the **GSM** radio signals.

The radio signals for CTEL and GPS are transmitted to the **CTEL and GPS antenna splitter (A2/57)** via a common antenna cable.

The **CTEL and GPS roof antenna (A2/49)** is an **active antenna** .

It is supplied with direct voltage via the antenna cable (**phantom feed**). The electronics in the antenna must ensure that the

- transmission signals of the cellular telephone are transmitted by the **CTEL and GPS roof antenna (A2/49)**
- the received signals of both antennas are made available to an antenna output.

i The antenna is linked via a coaxial cable to the **CTEL and GPS antenna splitter (A2/57)** .

Function as of 01.09.01

The **CTEL and GPS roof antenna (A2/49)** is a new version of the combination antenna for CTEL and GPS.

It has an integrated antenna splitter and an antenna amplifier, which eliminates the need for the **CTEL and GPS antenna splitter (A2/57)** . splitter

The **CTEL and GPS roof antenna (A2/49)** has connections for

- Cellular telephone,
- GPS navigation system and
- GPS E-Call (USA)

GPS/TELEPHONE ROOF ANTENNA, LOCATION/TASK/DESIGN/FUNCTION - GF82.70-P-4111A

MODELS 140, 210 up to 31.5.98 with CODE (348) TELE AID emergency call system

MODELS 129, 202, 208.3, 210 as of 6/198, 220 with CODE (347) TELE AID emergency call system (D2B)

MODEL 140 as of 1.1.98, 168, 202, 208.3, 210.0 as of 1.1.98, 210.2 with CODE (351) Auto pilot system (APS)

MODELS 163,168, 208.3, 210 with CODE (353) Audio 30 APS

MODELS 163, 208.3, 210, 220 with CODE (352a) COMAND operating and display system with CODE (353) Audio 30 APS with CODE (853) MB standard CTEL telephone with CODE (854) MB portable CTEL telephone with CODE (855) TELE AID

MODEL 163 with CODE (522) Modular control system (MCS) Radio USA

Location shown on model 210

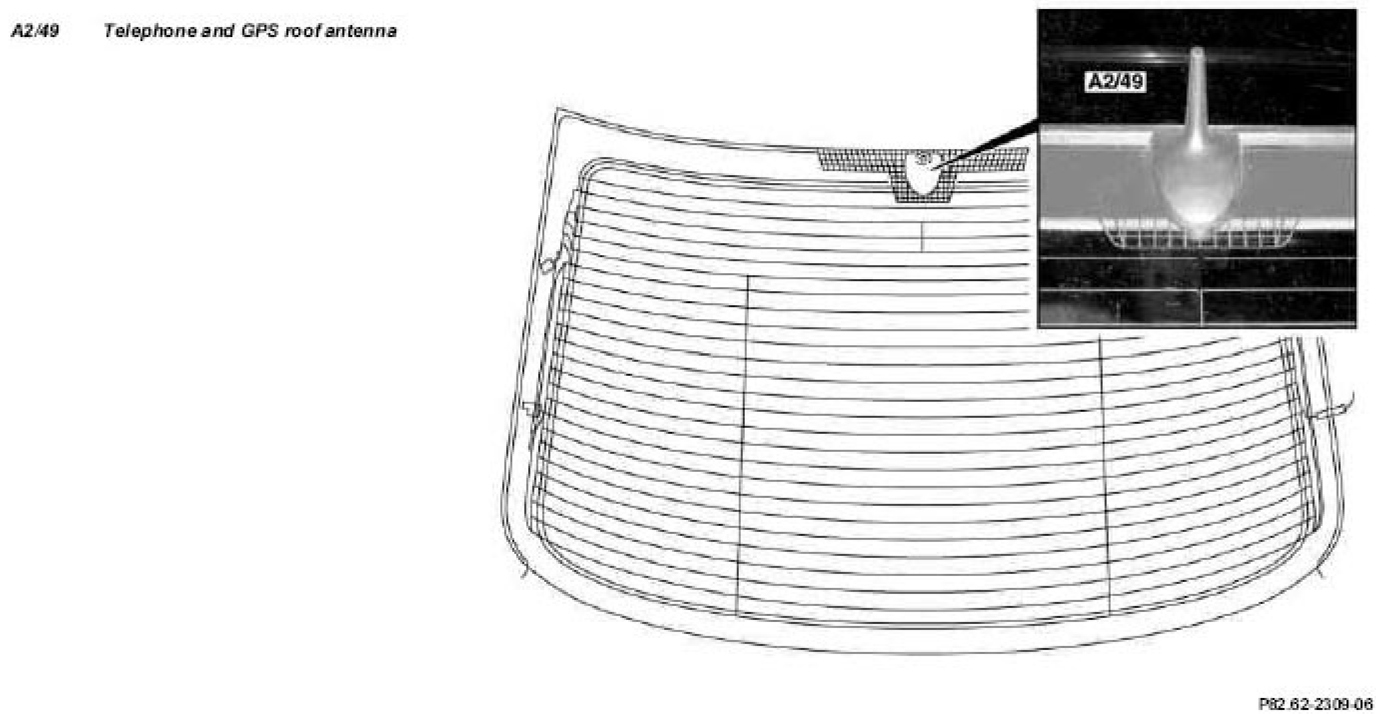


Fig. 81: Identifying Telephone And GPS Roof Antenna

i The telephone antenna (A2/49a1) and the GPS antenna (A2/49a2) are integrated in an antenna housing.

	GPS/telephone roof antenna, location	Models 129, 140, 168, 202, 208.3, 210 Model 220 Model 163	GF82.70-P-4111-01A GF82.70-P-4111-01B **GF82.70-P-4111-01GH**
	GPS/telephone roof antenna, purpose	Receiving and amplifying the global positioning system (GPS) satellite signals as well as transmitting and receiving the mobile radio signals (GSM 900 MHz).	
	GPS/telephone roof antenna, design	The GPS/telephone roof antenna (A2/49) consists	

		of two components: • CTEL antenna (A2/49a1) • GPS antenna (A2/49a2)	
		Model 163 as of 01.09.01	**GF82.70-P-4111-03GH**
	GPS/CTEL roof antenna, function	Code 351 or code 353, except models 129 /163 /220	GF82.70-P-4111-04A
		Code 353 for model 163	**GF82.70-P-4111-04D**
		Code 347 or 348 or 352 except models 168/163	GF82.70-P-4111-04B
		Model 163 as of 01.09.01	**GF82.70-P-4111-04GH**

MODULAR CONTROL SYSTEM (MCS), FUNCTION - GF82.85-P-0011GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (819) 6-disk CD changer in trunk with CODE (491) U.S. version

The following systems can be operated centrally with the aid of the **radio and navigation unit (A2/56)** :

- **Cassette deck**
- **Radio**
- **Single CD player and CD player with changer** (optional)
- **Sound system** (optional)
- **Navigation** (optional)
- **Telephone** (optional)

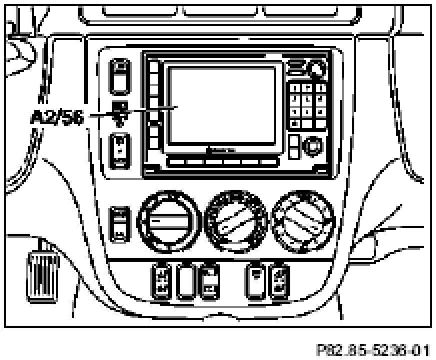
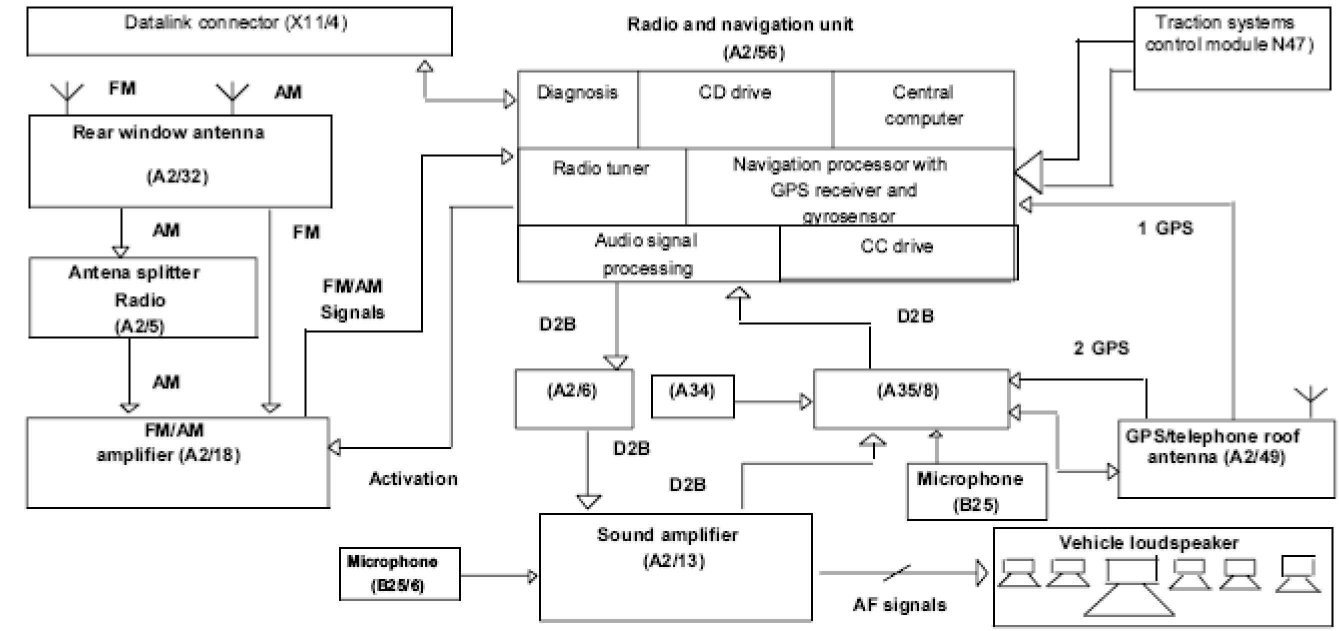


Fig. 82: Identifying Radio And Navigation Unit



Block diagram for entire MCS system *illustrated with following equipment specification:*

- *Sound system (code 810)*
- *CD changer (code 819)*
- *with telephone*

GPS	*Global positioning system*
1 GPS	*Global positioning system for navigation*
2 GPS	*Global positioning system for E-call (code 349)(only USA)*
D2B	*Digital data bus*
AF	*Audio frequency (20 Hz ... 20 kHz)*
A2/6	*CD player with changer (in trunk)*
A2/49	*Cellular telephone and GPS roof antenna*
A34	*Telephone handset*
A35/8	*E-call control module*
B25	*Hands-free system microphone*
B25/6	*Sound amplifier microphone*

Fig. 83: MCS System Block Diagram

MCS system

The **radio and navigation unit (A2/56)** is the central component of the MCS system . It has a video-capable **5" active matrix TFT display** for indicating information such as control menus and map data for navigation. Actuation is accomplished in operating modes **NTSC** (US standard) **PAL** (ECE standard). It is operated with fixed function keys and a rotary knob, a **joystick** as well as with menu-guidance on the display.

The basic version of the **radio and navigation unit (A2/56)** is equipped with

- a radio reception unit,
- a compact cassette player and
- a speed-dependent volume control.

Diagnostic interface

To read out actual values and DTC's of the MCS and components connected via the digital data bus (**D2B**) diagnosis with the hand-held tester is possible via a K-line.

MCS bus system

The digital components of the **radio and navigation unit (A2/56)** are interlinked via the digital data bus (**D2B**). Control data, audio signals and other information are transmitted between the various system components via the digital data bus (**D2B**) Since some of the individual components operate with various data formats or place different requirements on the transmission speed and transmission security, various bus systems are installed.

	Switch on/off behavior, function		**GF82.85-P-2006GI**
	Radio operation, function		**GF82.60-P-2001GI**
	CD-player mode, function		**GF82.60-P-2002GI**
	Telephone mode, function		**GF82.85-P-2007GI**
	Cassette mode, function		**GF82.85-P-2010GI**
	Navigation mode, function		**GF82.85-P-2012GI**
	Volume/tone adjustments, function		**GF82.60-P-2003GI**
	Radio/navigation unit location/task/design/ function		**GF82.61-P-4109GI**

MODULAR CONTROL SYSTEM (MCS) FUNCTION DESCRIPTION CONTENTS - GF82.85-P-0995GIZ

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (819) 6-disk CD changer with CODE (491) U.S. version

	Modular control system (MCS), function	* for USA only	**GF82.85-P-0011GI**
	Switch on/off behavior, function		**GF82.85-P-2006GI**
	Radio operation, function		**GF82.60-P-2001GI**
	CD-player mode, function		**GF82.60-P-2002GI**
	Telephone mode, function		**GF82.85-P-2007GI**
	Starguide, function		**GF82.85-P-2014GI**
	Information service, function		**GF82.85-P-3016GI**
	Data transmission for Starguide, function		**GF82.85-P-3017GI**
	Cassette mode, function		**GF82.85-P-2010GI**
	Navigation mode, function		**GF82.85-P-2012GI**
	Voice output, function		**GF82.85-P-3001GI**
	Volume/tone adjustments, function		**GF82.60-P-2003GI**
	Constant map matching, function		**GF82.61-P-2002GI**
	Basic location finding, function		**GF82.61-P-3006GI**

	Global positioning system location finding, function		**GF82.61-P-3007GI**
	Map-supported location finding, function		**GF82.61-P-3008GI**
	Route calculation, function		**GF82.61-P-3011GI**
	Dynamic route guidance, function		**GF82.61-P-4003GI**
	Guidance, function		**GF82.61-P-3012GI**
	Destination guidance in digitized map area, function		**GF82.61-P-4000GI**
	Destination guidance in non-digitized map area, function		**GF82.61-P-4001GI**
	Modular control system (MCS) survey of system components location/task/design/ function		**GF82.85-P-9995GIZ**

CONTENTS, FUNCTION DESCRIPTION OF COCKPIT MANAGEMENT AND DATA SYSTEM (COMAND) - GF82.85-P-0997GHZ

MODEL 163

	Cockpit management and data system (COMAND) function		GF82.85-P-0003GH
	Switch-on/switch-off characteristics, function		GF82.85-P-2006GH
	Radio operation, function		GF82.60-P-2001GH
	CD-player mode, function		GF82.60-P-2002GH
	Volume/tone adjustments, function		GF82.60-P-2003GH
	Navigation mode, function		**GF82.85-P-2012GH**
	Constant map matching, function		GF82.61-P-2002GH
	Basic location finding, function		GF82.61-P-3006GH
	Global positioning system location finding, function		GF82.61-P-3007GH
	Map-supported location finding, function		GF82.61-P-3008GH
	Route computation, function		GF82.61-P-3011GH
	Destination-finding system, function		GF82.61-P-3012GH
	Destination finding in digitized map area, function		GF82.61-P-4000GH
	Destination finding in non-digitized map area, function		GF82.61-P-4001GH
	Dynamic destination finding, function	With dynamic destination finding (code 815) not for	GF82.61-P-4003GH

		USA	
	CTEL mode, function	For MB CTEL standard (code 853) or MB portable CTEL (code 854).	GF82.85-P-2007GH
	Voice command, function		GF82.85-P-3001GH
	Table of contents, function description of antenna system (ATS)		GF82.62-P-0999B
	Overview of system components for cockpit management and data system (COMAND), location/task/design/function		**GF82.85-P-9997GHZ**

SWITCH ON/OFF BEHAVIOR, FUNCTION - GF82.85-P-2006B

MODEL 163, 168, 170, 203.0 /2 /7, 208, 209.3 /4, 210 with CODE (353) Audio 30 APS

ON/off characteristics

The radio (A2) is switched on by pressing the "ON" button. The radio (A2) likewise switches On automatically by rotating the ignition key (models 163, 168, 170, 208, 210) or transmitter key (A8/1) (models 203, 209) into position 1 "circuit 15R ON", provided that it was switched on immediately before the last time "circuit 15R ON" was switched off. However, if the radio (A2) was switched off last, only the following components are activated with "circuit 15R ON":

- Digital databus (D2B)
- Continuous location finding

In this case the display on the radio (A2) remains Off. This allows quick availability of the system when the "ON" button is then actuated.

Following each switch-on operation, the system returns to the state in which it was before it was last switched off (e.g. navigation basic menu).

[i] The bus systems and navigation processor for location finding (for quicker readiness for operation) are already activated when the driver door is opened.

Switch off characteristics

The system is switched off by switching off at the "ON" button or when "circuit 15R ON" is switched off.

The unit switches off automatically after an hour, if when switching on the ignition key (models 163, 168, 170, 208, 210) or transmitter key (A8/1) (models 203, 209) has not been inserted in the ignition switch.

Run-on time/navigation

The data on the current navigation are stored for 12 hours after the radio (A2) is switched off.

	Radio operation, function		**GF82.60-P-2001B**
	CD-player mode, function		**GF82.60-P-2002B**
	Telephone mode, function	Model 209	GF82.85-P-2007QA
	Navigation mode, function	Model 163, 168, 170,208,210 Model 203, 209	**GF82.85-P-2012B** GF82.85-P-2012EE

SWITCH-ON/OFF CHARACTERISTICS, FUNCTION - GF82.85-P-2006GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

Switch-on characteristics

Activation of entire system

When the ignition/starter switch is turned to position **1(c.15R, ON**) the **display is switched on** , if the **radio and navigation module (A2/56)** has been switched on before the ignition key was removed the last time.

The **radio and navigation module (A2/56)** is now ready for operation. The system active before the last switch-off (e.g. radio) is switched on and the corresponding basic menu displayed. If the **radio and navigation module (A2/56)** has been switched off for longer than **60 min** a warning display appears with general specifications for using the system.

i When a telephone call is received the **radio and navigation module (A2/56)** switches on automatically.

Behavior when rotary knob is pressed

The **radio and navigation module (A2/56)** can also be switched on the when the **remote control key (A8/1) is removed** by **actuating** the rotary knob.

All functions are then available for **60 min** . After expiration of **60 min** the **radio and navigation module (A2/56)** switches off automatically.

This function can only be repeated by actuating the rotary knob again.

Switch-off characteristics

The **radio and navigation module (A2/56)** can be switched off by turning the ignition key to position **0 c. 15C, OFF**).

When the rotary knob is actuated in the switched-on state the **radio and navigation module (A2/56)** can be switched off.

Switch-off characteristics when voltage is too low

The central processor in the **radio and navigation module (A2/56)** permanently monitors the battery voltage. Depending on the voltage value the system will act as follows:

- **The battery voltage less than 9.5 volts**

If the battery voltage drops below **9.5 volts** the **radio and navigation module (A2/56)** switches off automatically.

If the system **switches off** and the voltage increases to greater than **9.5 volt the radio and navigation module (A2/56) does not switch back on automatically.**

If the system switches off it can be switched back on **manually** .

	Radio mode, function		**GF82.60-P-2001GI**
	CD-player mode, function		**GF82.60-P-2002GI**
	Telephone mode, function		**GF82.85-P-2007GI**
	Cassette mode, function		**GF82.85-P-2010GI**
	Navigation mode, function		**GF82.85-P-2012GI**

TELEPHONE MODE, FUNCTION - GF82.85-P-2007GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

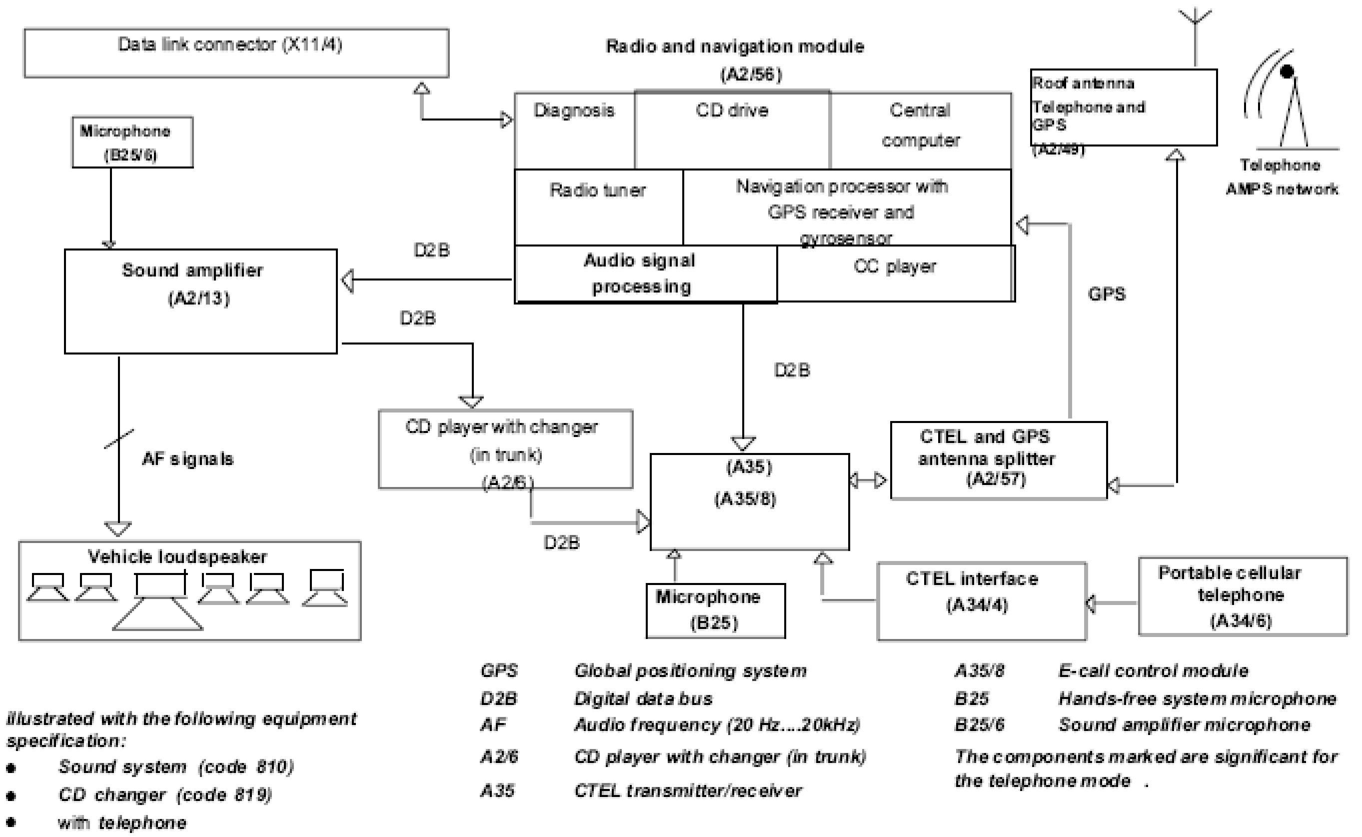


Fig. 84: MCS Telephone System Block Diagram

The telephone system can be operated as follows:

- directly on the **radio and navigation module (A2/56)** or
- **with the portable cellular telephone (A34/6)** or
- with the **telephone handset (A34)**

Making a call, function

The data telegrams (e.g. button actuation) for controlling the telephone system are relayed to the telephone transmitter/receiver (A35) from the **radio and navigation module (A2/56)** via the digital data bus (**D2B**)

The actual telephone connection is completed by the **CTEL/GPS antenna splitter (A2/57) and the CTEL and GPS roof antenna (A2/49)**

The audio source is automatically muted during a telephone call.

After switching over to the telephone mode the following display appears:

- Strength of received **signal** (illustrated with **5 beams**)
- Message indicating readiness for telephone mode with "**Ready** " display.

- Multifunction keys **"NUM "** and **"NAME** ".
- **Entering code**

  The telephone can be protected against undesired use by entering a **three** - digit code. All telephone functions are disabled except the emergency call function.

The telephone can be enabled again by entering the **three** - digit code (correction possible with " **Clear** " button in the event of incorrect entry) and actuation of the multifunction key" **OK** ".

The following functions are available in the **telephone** mode:

- **Emergency call function**

  This function offers the possibility of transmitting an emergency call within the reception range of the radio telephone network. The **emergency call** number is stored in the **memory location 1** and can be called even when the telephone is disabled. The emergency call is performed by pressing and holding **control button 1** down longer than **1 second " EMERGENCY** " appears on the display. An emergency call can be terminated by pressing " the "**END** " button.

- **Manual entry of telephone number**

  Telephone numbers can be entered manually on the number pad.

An incorrectly entered number can be deleted by momentarily pressing the " **CLEAR** " button. If the" **CLEAR** " button is pressed for longer than **2 s** all telephone numbers deleted

[i] If the number entered consists of only 1 or 2 numbers, the telephone number stored in the memory with this code is dialed.

The entered telephone number can be transmitted to the telephone by pressing the " **SEND** " button. The telephone compares the transmitted telephone number with the telephone number stored in the memory. If the numbers coincide the associated name, the memory location number and the telephone appear on the display (depending on setting).

If the numbers do not coincide, the telephone number entered is still displayed.

Then the connection can be completed. The duration of the telephone call is indicated in minutes and seconds. The call can be terminated by pressing the " **END** " button.

- **Selecting stored telephone number**

  The memory can be called up by pressing the multifunction key" **NAME** " or "**NUM** "."**NAME** " indicates the stored names on the display" **NUM** " indicates the memory location number as well as the associated telephone number. By pressing the" **joystick** " up or down the stored entries are displayed. Pressing to the right or left causes display of the next **4** entries or previous **4** entries.

[i] If a name is not available for the stored telephone number, the display is switched over and the memory location and the telephone number are displayed.

By manually entering **1** or **2** numbers and subsequent actuation of the multifunction key" **NAME** " or "**NUM** " the name stored under this memory location number or the stored telephone number are indicated.

Pressing " **SEND** " button completes the desired connection. If no connection is to be completed, the memory area can be exited by pressing the multifunction key" **EXIT** ".

- **Quick dial**

  When a one or two-digit number is entered and the " **SEND** " button is actuated the telephone number stored under this memory location number is dialed.

- By pressing and holding one of the number buttons **1** to **9** for more than **2 s** the telephone number stored under this memory location number is dialed. In this case it is not necessary to actuate the " **SEND** " button.

  [i] **Memory location functions 1** number is reserved for **emergency** !

- **Redialing**

  Pressing the" **SEND** " button without previously entering a telephone number calls up the last **5** selected telephone numbers on the display. It is possible to select the desired telephone number by pressing the" **joystick** " up or down. The connection is completed by actuating the" **SEND** " button. This area can be exited by pressing the multifunction key" **EXIT** ".

- **Incoming calls**

  During an incoming call all other audio sources are set to mute and "**CALL** " appears on the display. The call can be accepted by pressing the " **SEND** " button or terminated by pressing the" **END** " button. During a call it is possible to continue dialing, e.g. enter a code number for an answering machine.

	GPS roof antenna/telephone, location/purpose/ design/function		**GF82.70-P-4111A**

CASSETTE MODE, FUNCTION - GF82.85-P-2010GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

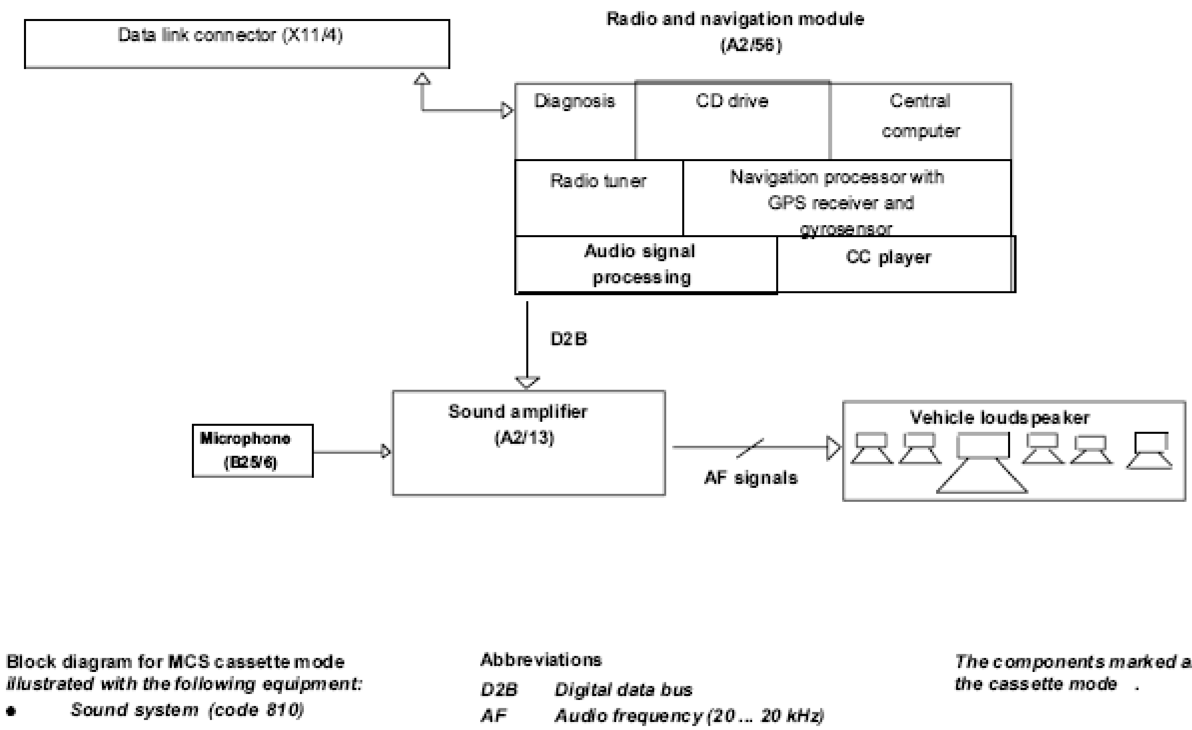


Fig. 85: MCS Cassette Mode Block Diagram

Playback of compact discs

When the" **Open** " button is pressed the display opens automatically releasing the slot for the **c** ompact cassettes (**CC**) and **c** ompact **d** iscs (**CD**). When the **radio and navigation module (A2/56)** is switched on the **CC** is pulled in automatically after it has been inserted beyond a pressure point. Then the playback of the **CC** starts with side **1** which is the side of the **CC** pointing upward. If a **CC** is defective or is wound too tightly, the message (" **Tape Error, Tape may be to tight** ") appears on the display.

1 CD slot
2 CC slot

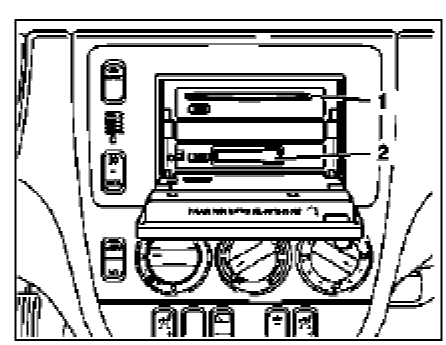


Fig. 86: Identifying CD Slot And CC Slot

The following functions are available for playback of the **CC** :

- **Auto reverse**

By pressing the multifunction key" **Side** " the side of the **CC** can be changed. This is indicated on the display by" **Side 1** " or" **Side 2** ". The side changes **automatically** when the end of the tape is reached.

- **Fast forward/rewind**

  Pressing the "**joystick** " to the **left right** causes the **CC** to be wound backward and forward at high speed. The procedure can be stopped by pressing the" **joystick** " again in any direction. When the end of the tape is reached the side is changed **automatically** and playback continues.

- **Music search**

  The music search feature can be started by pressing the " **joystick** " upward for forward or downward for rewind. During the search "**MS FWD** " or "**MSREW** " appears on the display. As soon as sufficiently large pause (**approx. 3 s**) is recognized, the search stops and playback starts automatically. The search can be stopped manually by pressing the" **joystick** " in any direction.

- **Scan function**

  The multifunction key" **Scan** " causes all titles on the **CC** to be played for **approx. 8 s** . . Pressing the multifunction key" **Scan** " again stops this procedure.

- **Dolby B**

  Actuating multifunction key" **Dolby** " activates this function. The Dolby system appears inverted on the display. Pressing again deactivates this function.

- **Pause "II"**

  The following events cause the function to change from "**Play** " to "**Pause** ":

  - Pressing multifunction key "**Pause** " (display changes from "**II** " to "**Play** ").
  - By an incoming or outgoing call
  - Switching over to another audio mode.

- **Pause recognition**

  Pressing the multifunction key" **Skip** " activates or deactivates the pause recognition function. If a pause of more than **15 s** . is recognized the drive changes **automatically** to fast forward. If this function is activated the display appears inverted.

	Volume/tone adjustments, function		**GF82.60-P-2003GI**

NAVIGATION MODE, FUNCTION - GF82.85-P-2012B

MODEL 163, 168, 170, 208, 210 with CODE (353) Audio 30 APS

Audio 30 APS block diagram in navigation mode

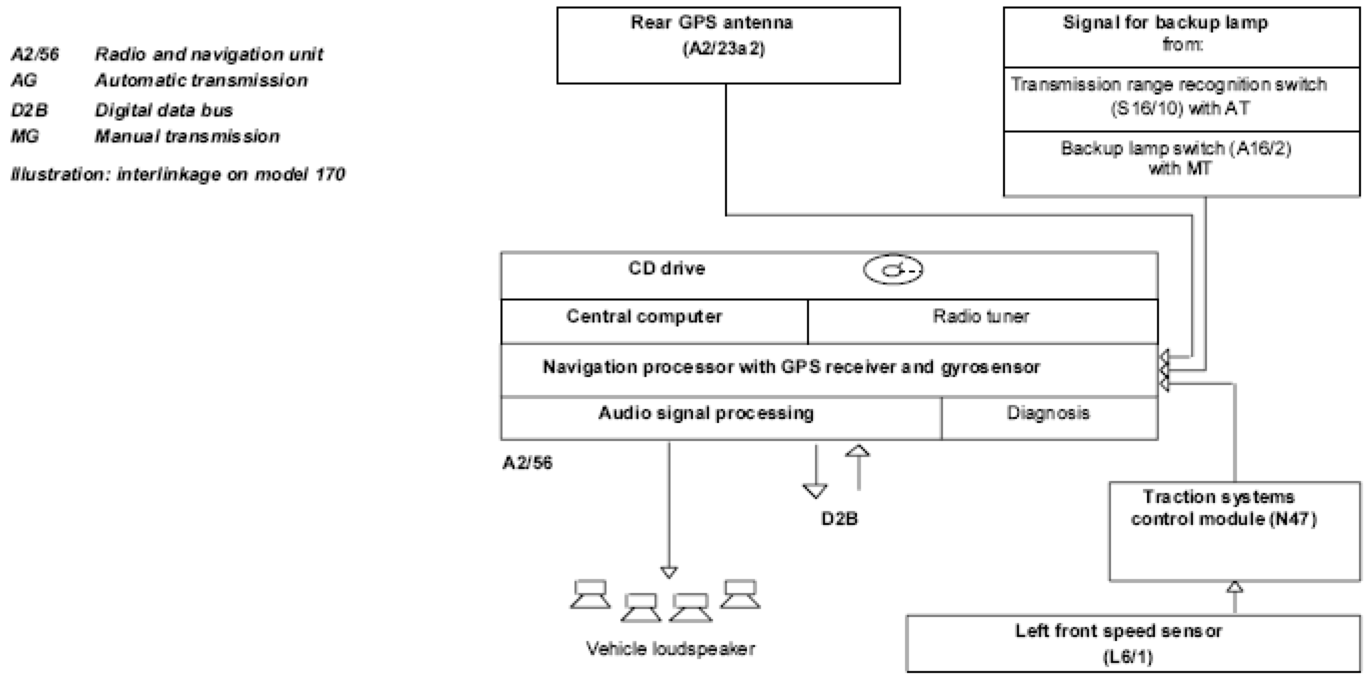


Fig. 87: Audio 30 APS In Navigation Mode Block Diagram

The **location of the vehicle** as well as the **direction and distance to the destination** (according to destination entered) is determined with the aid of the navigation system. Then the required measures to reach the destination are started **(guidance)** .

The navigation system can be activated by pressing the "NAV" button on the **radio and navigation unit (A2/56)** .

A **navigation processor** with CD-ROM drive is integrated into the **radio and navigation unit (A2/56)** for reading in the navigation data (digital map, speech segments and software).

[i] The navigation CD-ROM drive can also be used to play audio CDs.

Entering destination

The destination can be entered with menu guidance on the **radio and navigation unit (A2/56)** and processed by the **navigation processor** . The system only allows entry of destination addresses stored on the CD-ROM.

The following possibilities are available for entering a destination:

- Call-up of destination stored in destination memory
- Free entry of destination with menu guidance based on name (when destination is stored on CD-ROM)

Location finding

The navigation processor continuously calculates the location of the vehicle with the aid of the following procedures:

- GPS location finding
- Basic location finding (dead reckoning)
- Map-supported location finding (map matching)

The correct position is determined by continuously comparing the locating result of these three procedures.

Route calculation

The route is calculated in the **navigation processor** according to the destination entered, or automatically, after deviating from the recommended route. The recommended route is stored in the navigation processor

Guidance

After the navigation processor has calculated the route, guidance is started. The driver receives continuous information with the aid of guidance symbols appearing on the display of the **radio and navigation unit (A2/56)** and **voice announcements** on the vehicle loudspeaker.

	Audio 30 APS block diagram	Model 163	**GF82.61-P-0002-02D**
		Model 168 Model 170 Models 208, 210	GF82.61-P-0002-02B GF82.61-P-0002-02A GF82.61-P-0002-02C
	Basic location finding (dead reckoning), function		**GF82.61-P-3006D**
	Global positioning system (GPS) location finding, function		**GF82.61-P-3007C**
	Map-assisted location finding, function		**GF82.61-P-3008C**
	Route calculation, function		**GF82.61-P-3011E**
	Destination guidance, function		**GF82.61-P-3012D**
	Loading language, function		**GF82.61-P-3003B**
	Volume and tone settings		GF82.60-P-2003A
	Radio mode, function		**GF82.60-P-2001B**
	CD player mode, function		**GF82.60-P-2002B**
	Radio and navigation unit, location/purpose/ design/function		**GF82.61-P-4109A**
	CTEL and GPS roof antenna, location/purpose/ design/function	Models 163, 168,208.3,210	**GF82.70-P-4111A**
	Global positioning system antenna, location/ purpose/design/function	Models 170, 208.4	GF82.61-P-4106A
	Antenna splitter,	Model 163	**GF82.85-P-3107B**

	location/purpose/design/ function		

NAVIGATION MODE, FUNCTION - GF82.85-P-2012GH

MODEL 163

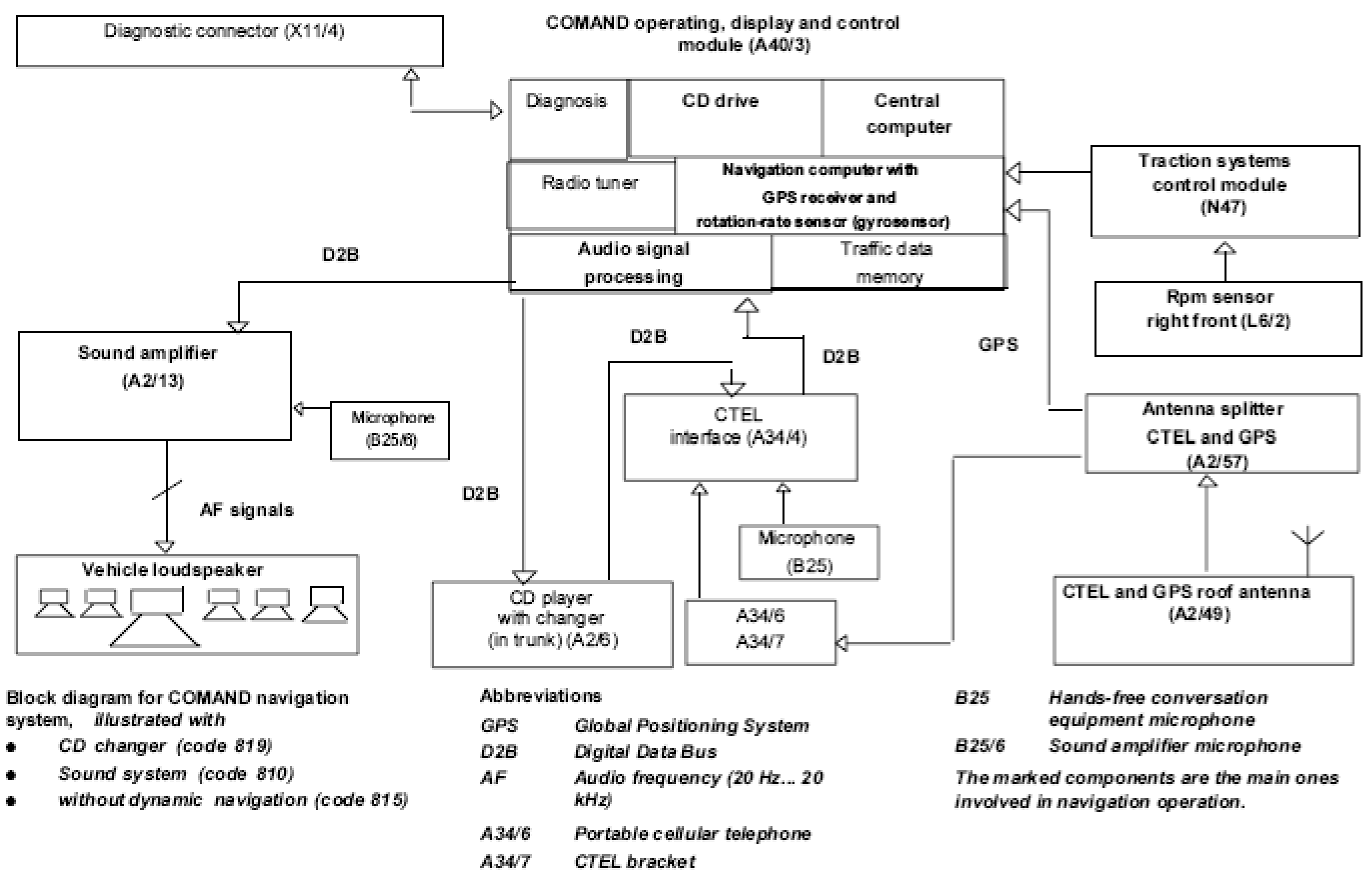


Fig. 88: COMAND Navigation System Block Diagram

Function

The navigation system is integrated into the **COMAND operating, display and control module (A40/3)** . The **location of the vehicle** and the **direction to and distance from the destination** (according to specified destination) are determined with the aid of this system. Afterwards the required measures for reaching the destination are initiated **(destination finding)** .

The navigation system is activated by pressing the " **NAVI** " button on the operating unit.

A **navigation processor** with **CD drive** for the digital map data is integrated in the **COMAND operating, display and control module (A40/3)** .

[i] The navigation **CD** drive can also play **audio CDs** .

[i] Note in **Navi-CD screen** :

"**Please insert Navi-CD type DX** "

Destination entry

Destination input is performed menu-guided on the operating unit and processed by the **navigation processor** . Only destinations that are also on the **CD-ROM** may be entered. The **COMAND operating, display and control module (A40/3)** provides the following destination input capabilities:

- Address...
- Destination memory...
- Destination using map...
- Special destinations (e.g. railway station, airport etc.)
- Travel guide...
- Intermediate destination entry
- Destination memory with individual destination designation capabilities
- Final destination...
- Dynamic route calculation by:
    - Blocking of route sections (traffic-jam function)
    - Traffic-jam ahead
    - Blocking in route list
- Incorporation of traffic information of an external service provider via telephone **TCS** (once, cyclic every **t=15min.**). Chargeable services.
- Incorporation of traffic information via RDS broadcast (**TMC**), free of charge

Predictive speller (editor)

During the entry of the destination the missing letters are augmented for an available list. This is only active in the **political index** and relates to the **destination** and **road** entry as part of the destination finding. In the menu **Special destinations** the submenus" **Bypassing other locations...** " and "**National destinations...** "are assisted.

The "**Supraregional destination...** " menu is divided up into additional submenues. The **individual menu points** in this submenu use the **political index** .

Dynamic addition

implemented during manual entry of the destination. During the entry of the destination the missing letters are augmented for an available list. The added letters are highlighted in black. Deleting is done one character at a time.

Position finding

COMAND continuously calculates the location of the vehicle with the aid of the following procedures:

- **GPS** position finding
- **Basic** position finding (compound position finding)
- **Map-supported** position finding (map matching)

The **navigation computer** calculates the most probable position by continuously comparing the position-finding results returned by these three methods.

Route calculation

The route is calculated by the **navigation processor** after entering the destination, or automatically, after a deviation from the suggested route has taken place.

In the **dynamic destination-finding system** the route calculation is automatically influenced by the incorporation of traffic information, free of charge via **RDS, TMC** or over an external provider **TCS** by telephone (chargeable).

The calculated route is stored in the **navigation processor** .

Destination-finding system

Destination finding is started once the navigation computer has performed the destination calculation.

Three display options are available for graphical representation of the destination-finding system:

1. with map
2. with map and symbol display before turn-off point

   --> MIX mode

3. with symbol display only (route guidance symbols)

Any of the three methods can be used. The destination-finding system is also supported by **voice output** from the vehicle loudspeakers.

	Route computation, function		GF82.61-P-3011GH
	Constant map matching, function		GF82.61-P-2002GH
	Basic location finding, function		GF82.61-P-3006GH
	Destination-finding system, function		GF82.61-P-3012GH
	Destination finding in		GF82.61-P-4000GH

	digitized map area, function		
	Destination finding in non-digitized map area, function		GF82.61-P-4001GH
	Volume/tone adjustments, function		GF82.60-P-2003GH
	Global positioning system location finding, function		GF82.61-P-3007GH

NAVIGATION MODE, FUNCTION - GF82.85-P-2012GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

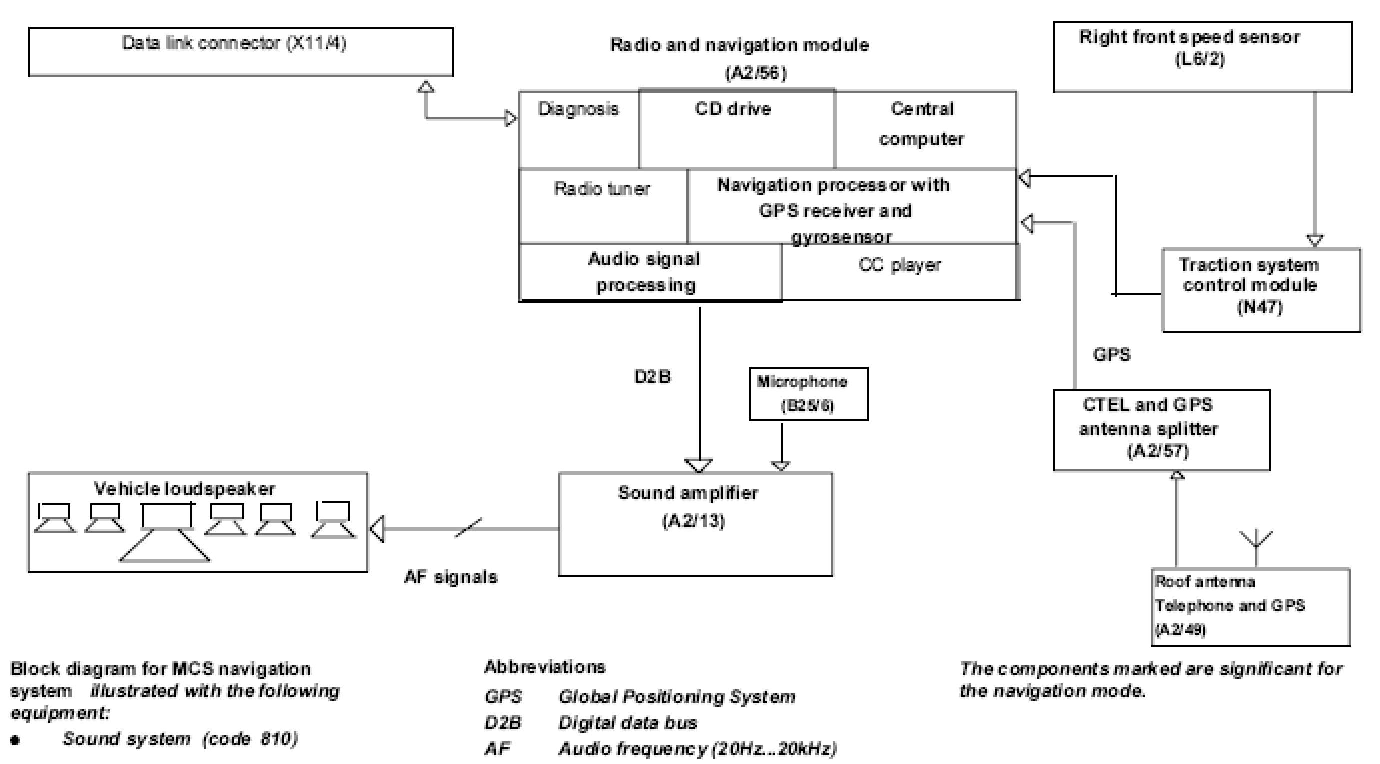


Fig. 89: Identifying MCS Navigation System Block Diagram

Function

The navigation system (optional) is integrated into the **radio and navigation module (A2/56)** .

With this system the **vehicle location** and the **direction** and **distance to destination** (after entering destination) are determined. Then the required measures are taken to reach the destination (**guidance**) .

The navigation system can be activated by pressing the" **NAVI** " button on the control module.

A **navigation processor** with **CD** drive for the **digital** map data is integrated (optional) into the radio and navigation module (A2/56)

[i] The navigation **CD** drive can also play audio **CD's** .

Destination entry

The destination can be entered with menu-guidance on the control module and is processed by the **navigation processor** . It is only possible to enter destinations which are stored on the **CD-ROM** .

Location finding

the **radio and navigation module (A2/56)** continuously calculates the vehicle location with the aid of the following procedures:

- GPS location finding
- Basic location finding (dead reckoning)
- Map-supported location finding (map matching)

The **navigation processor** calculates the most probable position by permanently comparing the location results of these **three** methods.

Route calculation

The route calculation is accomplished in the **navigation processor** after the destination is entered or **automatically** following a deviation from the suggested route.

The calculated route is stored in the **navigation processor** .

Route guidance

After the navigation processor has calculated the route guidance starts.

Route guidance is accomplished graphically with a **digital** map with direction arrows as well as with the aid of the **voice output** on the vehicle loudspeakers. When the " **NAVI VOICE** " button is pressed the last current navigation command is repeated. The volume of the voice output can be set on the volume knob during a navigation command. The following functions are available in the navigation mode:

When the" **NAVI MENU** " button is actuated the main navigation menu opens.

All other entries can be made with the " **joystick** ".

- **"Dest"** (destination entry)**radio and navigation module (A2/56)** offers the following possibilities for destination entry:

- Address
- Junction (intersection)
- Selecting hotel, church or point of interest
- Direct entry on map (map cursor)
- Calling up stored destination (recent route)
- Address book
- Selection of address in date book (today's plan)

After selecting one of these possibilities, e.g. address, it is possible to proceed with the entry of additionally required information. Incorrect entries can be erased with " **Delete** " Spaces can be entered with " **Space** ".

After completely entering the information confirm by pressing the "**joystick** " (Ent).

"**OK to proceed** " starts calculation of the route.

- **Setup** (settings)

  Various settings for the screen display and route guidance can be made with this menu.

- **Option** (selection)

  With this menu information, e.g. location, can be called up.

  Entries in address book, in date book or in list of last driven routes can be processed by selecting correspondingly.

- **Route**

  This menu provides settings influencing the current route guidance.

  [i] This menu can only be called up during route guidance.

- **Detour multifunction key**

  Pressing the multifunction key" **DETR** " causes the navigation processor to calculate the closest possible alternative route, e.g. in the case of traffic jams, constructions sites, etc.

- **STOP multifunction key**

  Route guidance can be terminated by pressing multifunction key" **STOP** ".

- **LIST multifunction key**

  Pressing multifunction key" **LIST** " calls up a list of roads to be driven in the current route guidance.

- **MUTE multifunction key**

  Muting voice output.

- **MAP multifunction key**

  Changing between map display and direction arrow display

  [i] Pressing the "**Clear** " key returns to the previous menu.

	Constant map matching, function		**GF82.61-P-2002GI**
	Route calculation, function		**GF82.61-P-3011GI**
	Guidance, function		**GF82.61-P-3012GI**
	Voice output, function		**GF82.85-P-3001GI**
	Volume/tone adjustments, function		**GF82.60-P-2003GI**

STARGUIDE, FUNCTION - GF82.85-P-2014GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

The **StarGuide system** uses the availability of the present technologies for telecommunications.

These are used for the purpose of personal information services.

[i] The service "**Dynamic route guidance** " will be added to the system at a later time.

Technical requirements:

- E-Call and
- MCS and
- newest navigation **CD** (it includes the current software for executing the offered services). The MCS is updated with this and
- the prerequisites required for executing the corresponding systems are fulfilled.

Organizational prerequisites:

- GPS **G** lobal **P** ositioning **S** ystem. Satellite-supported system for precise positioning and navigation. At present **26** satellites are in operation orbiting the earth on **6** orbits.
- AMPS: **A** dvanced **M** obile **P** hone **S** ystem. The AMPS network is now available to **98% of the population in the most densely-populated areas of the USA** .
- SOC: **S** ervice **O** perating Center. The **SOC** takes over all individual requirements of the driver and transmits the corresponding information to the vehicle.

Concept of personal information service:

- Individual information and news transmission according to personal interest profile (stock exchange, weather, sport...)
- Transmitting a request via a button (**SVC** button) to the **S** ervice **O** perating **C** enter (**SOC**)
- e **S** ervice **O** perating **C** enter (**SOC**) transmits the customer profile corresponding to the individual information and news.
- The data transmitted is indicated on the display of the **radio and navigation module (A2/56)** and can then be read.

	Information service, function		**GF82.85-P-3016GI**
	Data transmission for Starguide, function		**GF82.85-P-3017GI**

VOICE OUTPUT, FUNCTION - GF82.85-P-3001GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

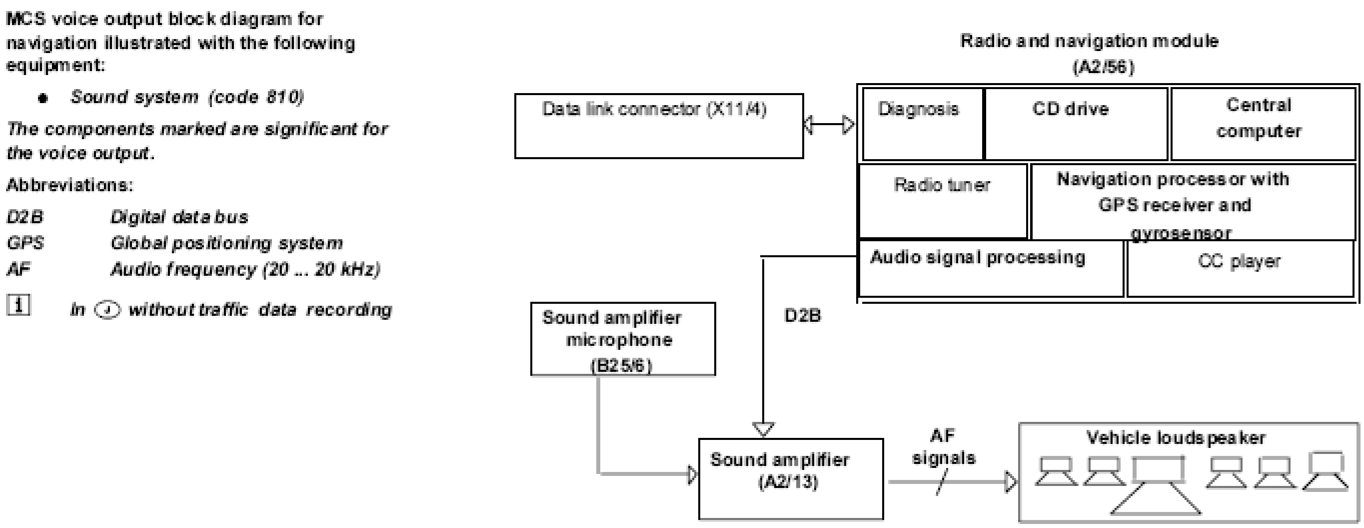


Fig. 90: MCS Voice Output Block Diagram

The **navigation system guidance** feature is supported significantly by **voice output** .

The voice data was originally stored as single-word segments on the navigation **CD-ROM** . This data set is transmitted automatically by the **CD-ROM** to the navigation processor and stored there.

The **navigation processor** interlinks these word segments to complete instructions or information and generates corresponding **AF** signals. The generated **AF** signals are transmitted internally in the **radio and navigation module (A2/56)** to the audio signal processing if required, amplified there and output via the vehicle loudspeakers.

With the **sound system (code 810)** the voice signals are transmitted to the sound amplifier (A2/13) from the audio signal processing via the digital data bus (**D2B**), amplified there, and then output via the vehicle loudspeakers.

[i] Several short, sequential drive recommendations are compiled to one single voice output.

Loading voice from CD-ROM

Only English is presently available for voice output on the **radio and navigation module (A2/56)** .

Volume of voice output

The voice output volume can be adjusted **during voice output** . This ensures that a defined interval is maintained between the volume of the current audio source and voice output.

Example:

If the volume is reduced during voice output and the preceding volume interval to the audio signal is not reached the **radio and navigation module (A2/56)**

reduces the level of the audio signal until the specified volume interval is reached again. The volume of the audio signal is then again increased after completion of the voice output to the level present before the voice output.

Moreover, the volume of the voice output cannot be reduced below a certain **minimum level** .

Voice output mute circuit

Navigation voice output can be muted by actuating the mute multifunction key. Muting remains active until the mute multifunction key is pressed again.

	Navigation mode, function		GF82.85-P-2012GI
	Radio and navigation module, location/purpose/ design/function		GF82.61-P-4109GI

INFORMATION SERVICE, FUNCTION - GF82.85-P-3016GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version

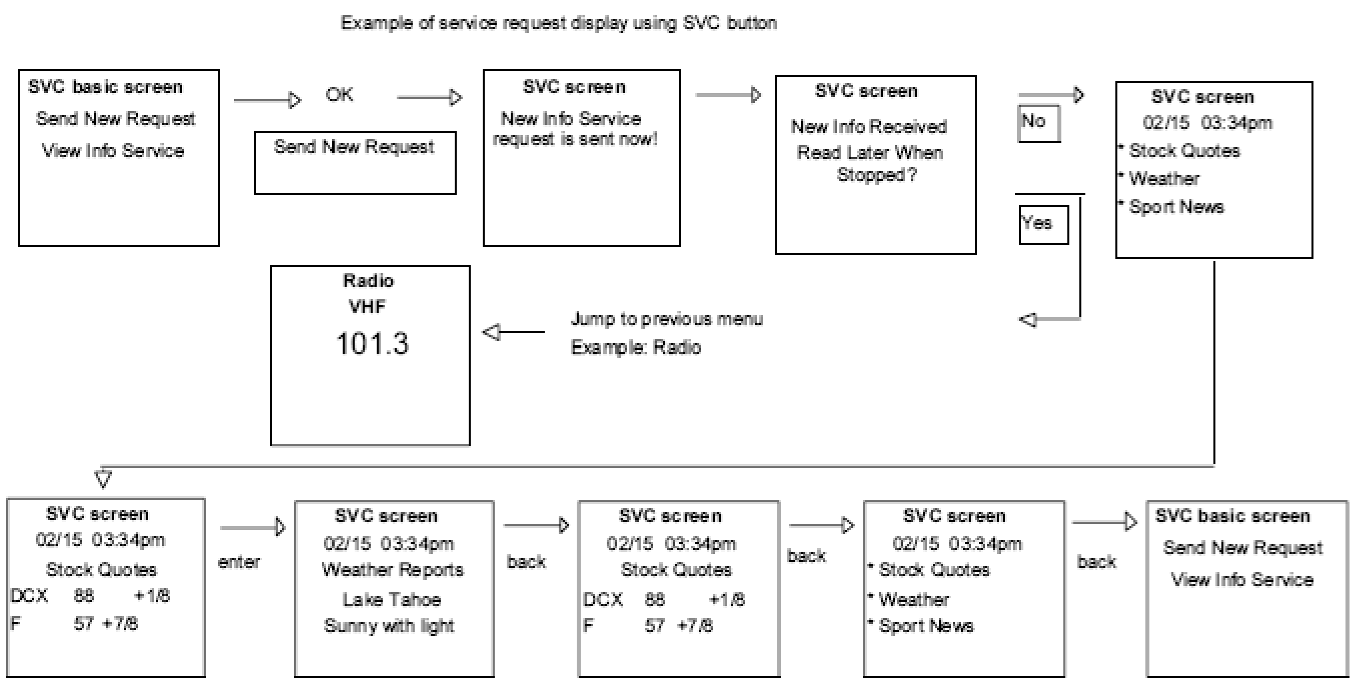


Fig. 91: Service Request Display Using SVC Button (Example)

Service request procedure

It is possible to change to the service mode with the button " **SVC** " on the **radio and navigation module**

(A2/56) .

A new request is selected in the basic screen " **SVC** ":

- **"Send New Request for Info Service "**

or optionally:

- **"View Info Service of..."**

allows a previous data record to be viewed.

Selection is possible with the knob/pushbutton on the **radio and navigation module (A2/56)** and confirmed by pressing. If" **Send New Request for Info Service** " is selected, the **radio and navigation module (A2/56)** transmits this request via the digital data bus (**D2B**) to the **E-call control module (A35/8)** and **CTEL transmitter/receiver (A35)** . It transmits the request to the service provider via the present telephone network.

The request is processed on the Internet on the basis of the personal information profile and sent to the vehicle via the telephone network.

A tone and the message:" **New Info Received!** " indicates reception to the user. The safety question:" **Read Later When Stopped?** " with the decision " **Yes** " or "**No** " serves for traffic safety.

Selecting:" **Yes** " leads to a return to the previous menu such as radio, CD, navigation......

Selecting:" **No** " lists the news according to the personal interest profile.

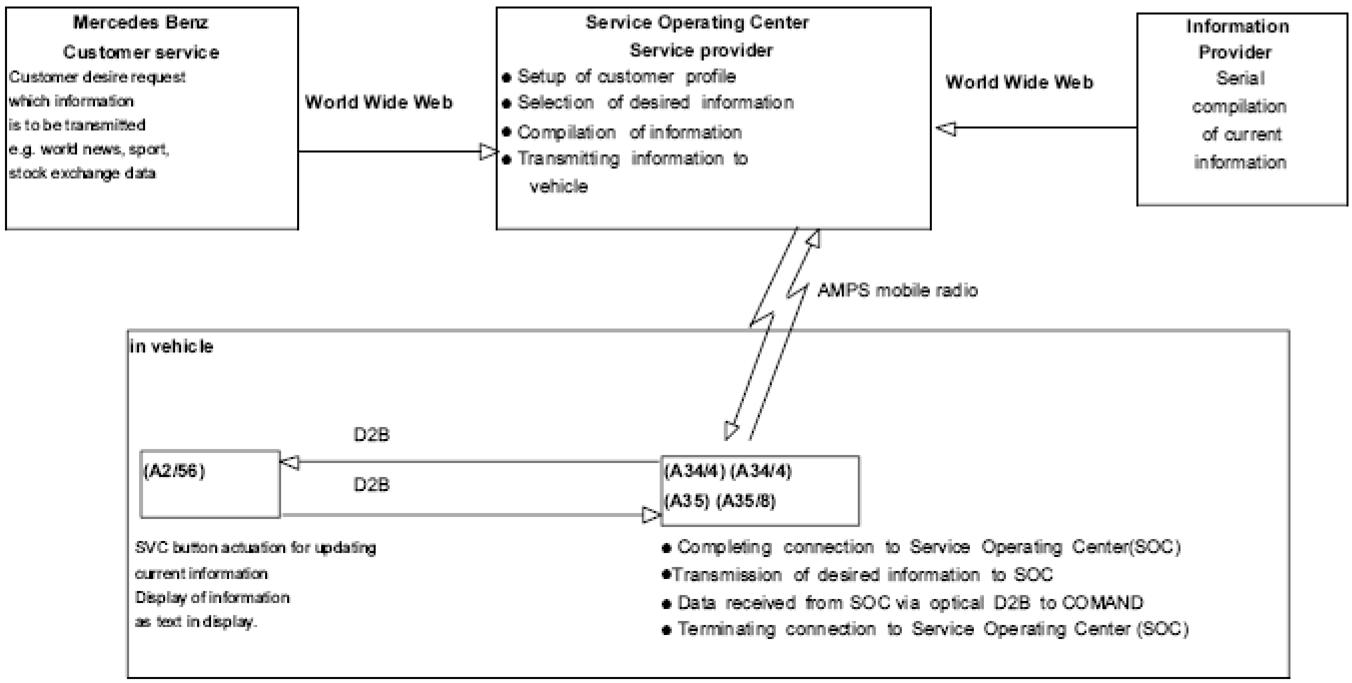
The messages can be read in sequence. **Pressing** the knob/ pushbutton button on the **radio and navigation module (A2/56)** jumps to the next news item. **Turning** the knob/pushbutton on the **radio and navigation module (A2/56)** scrolls the news. With the" **BACK** " button on the **radio and navigation module (A2/56)** it is always possible to jump back to the previous menu.

[i] The information that is received can be read page by page. It is not possible to jump directly to a certain page. The format can be changed by the operator.

	Starguide, function	As of 09/00	**GF82.85-P-2014GI**
	Data transmission for Starguide, function	As of 09/00	**GF82.85-P-3017GI**

DATA TRANSMISSION FOR STARGUIDE, FUNCTION - GF82.85-P-3017GI

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (316) MB GSM cellular telephone (D2B) with CODE (818b) Single CD player - additional unit with CODE (491) U.S. version



A2/56 *Radio and navigation module* *A35* *CTEL transmitter/receiver*
A34/4 *CTEL [TEL] interface* *A35/8* *E-call control module*
D2B *Digital data bus* *A34/6* *Portable cellular telephone*

Fig. 92: Connection Schematic Between Vehicle And Center Via Mobile Telephone

System concept of information service:

The vehicle owner determines his own interest profile for service information such as world news or stock exchange data. He transmits the desired information to the Mercedes Benz Customer Service. This profile is indicated to the **S** ervice **O** peration Center (**SOC**).

With the" **SVC** " button on the **radio and navigation module (A2/56)** it is possible to transmit an update request for service information to the **S** ervice **O** perating **C** enter (**SOC**).

In the **S** ervice **O** peration **C** enter (**SOC**) this customer profile is used for selecting information. The desired information is compiled by the information provider and transmitted to the vehicle via the **S** ervice **O** peration **C** enter (**SOC**).

The data transmitted is indicated on the display in the **radio and navigation module (A2/56)** .

	Starguide, function		**GF82.85-P-2014GI**
	Information service, function		**GF82.85-P-3016GI**
	Telephone mode, function		**GF82.85-P-2007GI**
	Modular control system (MCS), function		**GF82.85-P-0011GI**

ANTENNA SPLITTER, LOCATION - GF82.85-P-3107-01B

Model 163 with code 353

A2/57	CTEL and GPS antenna splitter
40	Coaxial cable for CTEL and GPS roof antenna (A2/49)
41	Coaxial cable to GPS receiver

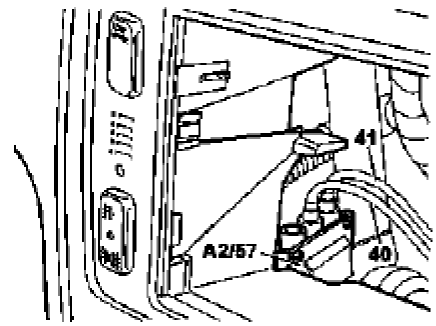


Fig. 93: Identifying Antenna Splitter Location

ⓘ ***It is possible to connect a GSM telephone to the connector not specified using a coaxial cable.***

ANTENNA SPLITTER, DESIGN - GF82.85-P-3107-03B

Model 163 with code 353

The **CTEL and GPS antenna splitter (A2/57)** consists of the following components:

- Active frequency splitter with GPS antenna amplifier
- Coaxial connection socket for **CTEL and GPS roof antenna (A2/49)**
- Coaxial connection socket for GSM telephone
- Coaxial connection socket for GPS receiver

ⓘ The power for the **CTEL and GPS antenna splitter (A2/57)** is supplied via coaxial cable from the GPS receiver (phantom feed).

ANTENNA SPLITTER, DESIGN - GF82.85-P-3107-03GH

Model 163 up to 31.08.01

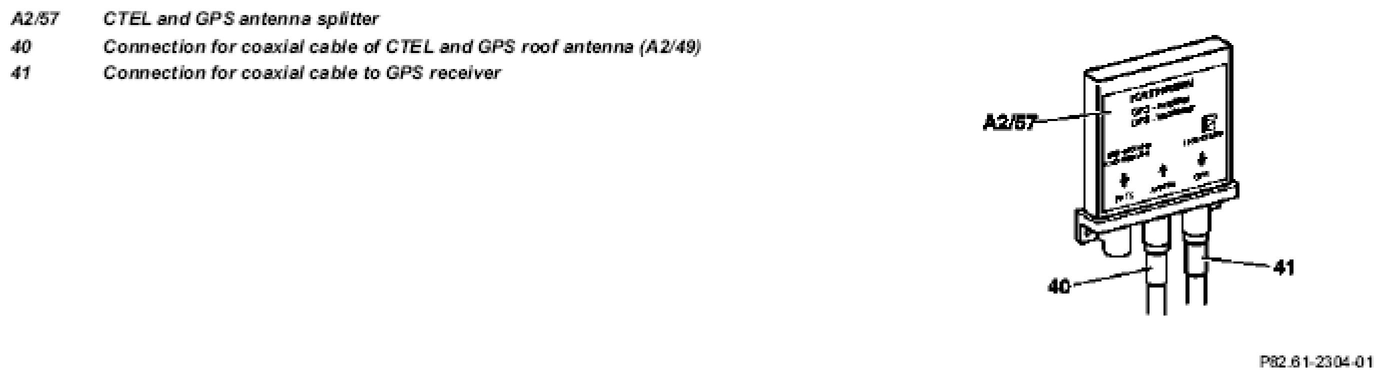


Fig. 94: Identifying CTEL And GPS Antenna Splitter Design

i ***A GSM cellular telephone can be connected by means of a coaxial cable to the non-designated connection.***

The **CTEL and GPS antenna splitter (A2/57)** consists of the following components:

- Active frequency splitter with **GPS** antenna amplifier
- Coaxial socket for the **CTEL and GPS roof antenna (A2/49)**
- Coaxial socket for a **GSM** CTEL
- Coaxial socket for a **GPS** receiver

i The voltage for the **CTEL and GPS antenna splitter (A2/57)** is supplied via the coaxial cable from the GPS receiver (**phantom feed**).

ANTENNA SPLITTER, FUNCTION - GF82.85-P-3107-04B

Model 163 with code 353

The **CTEL and GPS antenna splitter (A2/57)** has the following functions:

- Separating the signals received from the **CTEL and GPS roof antenna (A2/49)** :

  The GSM and GPS signals are received by the antenna splitter via an antenna lead and leave the **CTEL and GPS antenna splitter (A2/57)** via two separate coaxial cables. In addition the GPS signals are amplified.

- Decoupling the GPS receiver from the GSM telephone transmitter:

  It must be ensured that the telephone transmitter signals do not reach the GPS receiver. The **CTEL and GPS antenna splitter (A2/57)** allows them to pass only in the direction of the roof antenna.

ANTENNA SPLITTER, FUNCTION - GF82.85-P-3107-04GH

Model 163 up to 31.08.01

The **CTEL and GPS antenna splitter (A2/57)** has the following functions:

- Separating the receiving signals from the **CTEL and GPS roof antenna (A2/49)** :

  The **GSM** and the **GPS** signals are received along an antenna cable at the antenna splitter and leave the **CTEL and GPS antenna splitter (A2/57)** in two separate coaxial cables. The GPS signals are additionally amplified.

- Decoupling the **GPS** receiver from the transmitter of the **GSM** cellular telephone:

  The transmission signals of the cellular telephone must not reach the **GPS** receiver. They are passed through by the **CTEL and GPS antenna splitter (A2/57)** only in the direction of the roof antenna.

ANTENNA SPLITTER, LOCATION/PURPOSE/DESIGN/FUNCTION - GF82.85-P-3107B

MODEL 163 with CODE (353) Audio 30 APS

A2/57 CTEL and GPS antenna splitter
40 Connection for coaxial cable from CTEL and GPS roof antenna (A2/49)
41 Connection for coaxial cable to GPS receiver

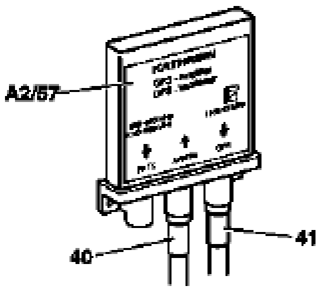


Fig. 95: Identifying CTEL And GPS Antenna Splitter Design

It is possible to connect a GSM telephone to the connector not specified using coaxial cable.

	CTEL and GPS antenna splitter, location		**GF82.85-P-3107-01B**
	CTEL and GPS antenna splitter, purpose	The CTEL and GPS antenna splitter (A2/57) is required for operating a GSM telephone and a GPS receiver with one single antenna cable.	
	CTEL and GPS antenna splitter, design		**GF82.85-P-3107-03B**
	CTEL and GPS antenna splitter, function		**GF82.85-P-3107-04B**

ANTENNA SPLITTER, LOCATION/PURPOSE/DESIGN/FUNCTION - GF82.85-P-3107GH

MODEL 163 up to 31.8.01

Location of component

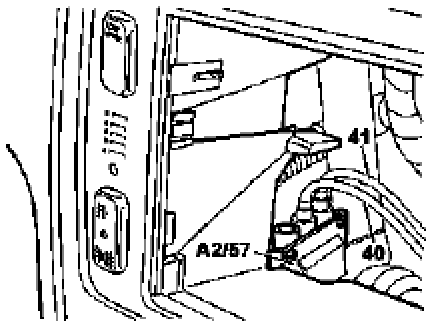


Fig. 96: Identifying Antenna Splitter Components Location

	CTEL/GPS antenna splitter, location	The **CTEL and GPS antenna splitter (A2/57)** is located in the center console on the left-hand side in the radio slot.	
	CTEL/GPS antenna splitter, purpose	The **CTEL and GPS antenna splitter (A2/57)** is required for operating a GSM cellular telephone and a GPS receiver over a single antenna cable.	
	CTEL/GPS antenna splitter, design		**GF82.85-P-3107-03GH**
	CTEL/GPS antenna splitter, function		**GF82.85-P-3107-04GH**

MODULAR CONTROL SYSTEM (MCS) SURVEY OF SYSTEM COMPONENTS LOCATION/TASK/DESIGN/FUNCTION - GF82.85-P-9995GIZ

MODEL 163 as of 1.9.01 with CODE (522) Modular control system (MCS) radio USA with CODE (357) Navigation system - additional unit with CODE (818b) Single CD player - additional unit with CODE (819) 6-disk CD changer in trunk with CODE (491) U.S. version

	Radio/navigation unit location/task/design/ function		**GF82.61-P-4109GI**
	Sound amplifier location/task/design/function	with CODE (810) Sound system	**GF82.62-P-3100GH**
	Antenna splitter, location/task/design/function		**GF82.85-P-3107B**

	FM/AM antenna amplifier, location/purpose/ design/function		**GF82.62-P-4101A**
	GPS/CTEL roof antenna location/task/design/ function		**GF82.70-P-4111A**
	CD player with changer, location/purpose/ design/function	With CD changer (code 819)	**GF82.64-P-3113GI**
	Modular control system (MCS) function description contents		**GF82.85-P-0995GIZ**

OVERVIEW OF SYSTEM COMPONENTS FOR COCKPIT MANAGEMENT AND DATA SYSTEM (COMAND), LOCATION/TASK/DESIGN/FUNCTION - GF82.85-P-9997GHZ

MODEL 163

	Operating, display and control module, location/ purpose/design/function		GF82.85-P-3114GH
	CD player with changer, location/purpose/ design/function	with (Code 819) CD changer	GF82.64-P-3113GH
	Sound amplifier, location/task/design/function	with CODE (810) sound system	**GF82.62-P-3100GH**
	FM/AM antenna amplifier, location/purpose/ design/function	MODELS 163, 168, 170, 208, 210	**GF82.62-P-4101A**
	GPS/telephone roof antenna, location/task/ design/function	MODELS 163, 168, 208.3, 210	**GF82.70-P-4111A**
	Antenna splitter, location/task/design/function	Model 163	**GF82.85-P-3107B**
	Contents, function description of cockpit management and data system (COMAND)		**GF82.85-P-0997GHZ**

E-CALL BACKUP ANTENNA, LOCATION/PURPOSE - GF82.95-P-4205GH

MODEL 163 as of 1.9.01 with CODE (349) E-Call emergency call system with CODE (491) U.S. version

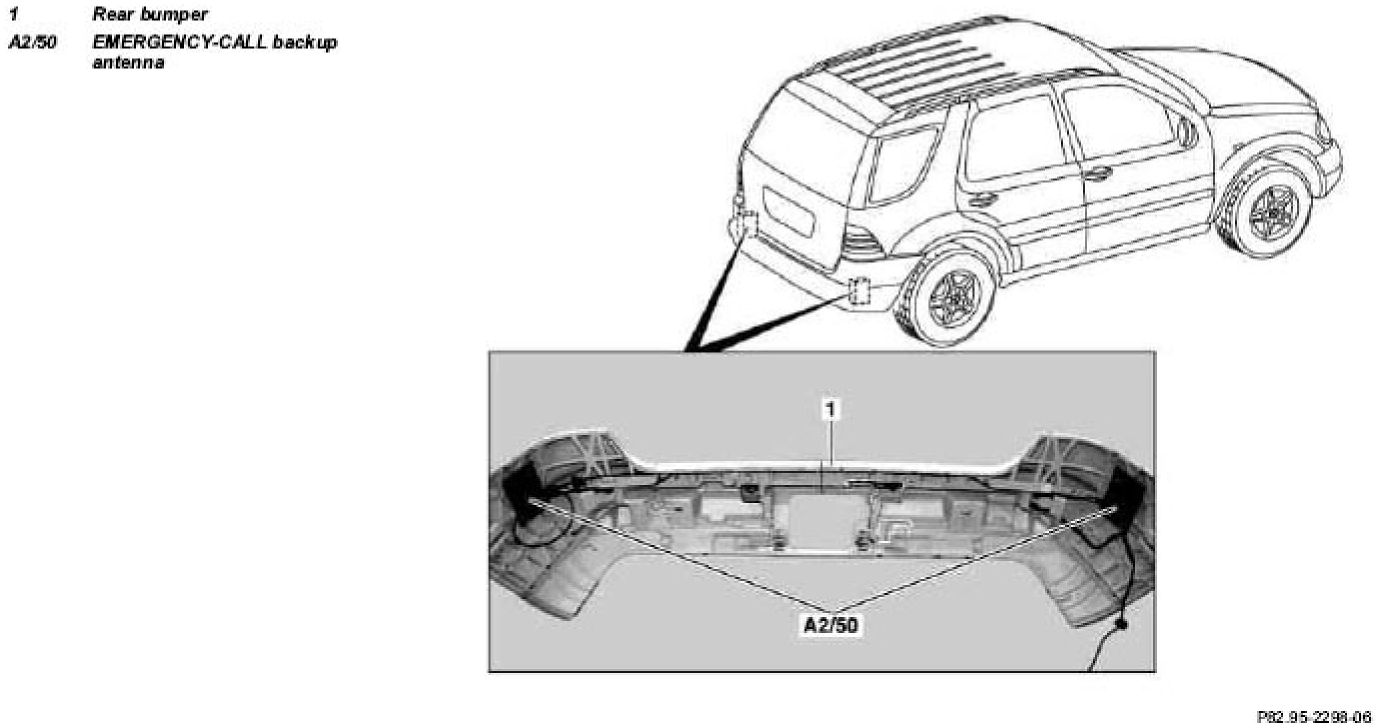


Fig. 97: Identifying E-Call Backup Antenna Location

	E-Call backup antenna, location	• The **EMERGENCY CALL backup antenna (A2/50)** is mounted on the **inside** of the rear **bumper** .	
	E-Call backup antenna, purpose	• **Transmitting** and **receiving** the **EMERGENCY CALL signals** if reception via the **CTEL and GPS roof antenna (A2/49)** is poor.	

SAFETY PRECAUTIONS

SAFETY INFORMATION: ELECTRICAL SYSTEM BODY - AS82.00-Z-9999ZZ

MODEL all

⚠ Danger!	Risk of death caused by high voltage at xenon headlamps. Risk of explosion/risk of fire caused by highly flammable materials in	MODEL all...	**AS82.10-Z-0001-01A**

	the vicinity of damaged xenon bulbs. Risk of injury caused by UV light, hot components at xenon headlamps and glass splinters produced by bursting xenon bulbs. Risk of poisoning caused by inhalation of mercury vapors and by toxic salts and mercury compounds being ingested or coming into contact with skin		
⚠ Danger!	Injury hazard from pinching and crushing, in extreme cases extremities can even be cut off when caught in windshield wiper mechanism.	MODEL all	**AS82.30-Z-0001-01A**
⚠ Danger!	The demagnetizing coil presents a lethal hazard for persons with active electronic implants (e.g. heart pacemakers).	MODEL 140...	AS82.85-Z-0001-01A

RISK OF DEATH, RISK OF EXPLOSION/RISK OF FIRE, RISK OF INJURY & RISK OF POISONING - AS82.10-Z-0001-01A

Do not come into contact with parts that are under high voltage. Persons with active electronic implants (e.g. heart pacemakers) must never work on xenon headlamps. Switch off entire lighting system. Wear insulated safety shoes, safety glasses and protective gloves. Remove highly inflammable materials from the hazard area. Ensure sufficient ventilation in the working area.

Potential risks

Risk of death

Due to the high voltages involved, contact with live components at the xenon headlamps could be life threatening!

Electric shocks can cause fibrillation of the heart or even cardiac arrest.

In addition, respiratory muscles may cramp up and result in respiratory failure.

Serious, possibly life-threatening, brain function disruptions are also possible.

It may take a few minutes for the consequences of an electrical shock to manifest themselves.

Risk of explosion/risk of fire

Highly flammable materials in the vicinity of damaged, energized xenon bulbs may result in explosion or cause fires.

Risk of injury

UV light may escape when operating xenon bulbs not properly installed in the xenon headlamps. This UV light may cause damage to the eyes (conjunctival infection) and to skin burns (sunburns) if skin is unprotected.

In both intact or faulty xenon headlamps, hot or glowing components may cause serious burn injuries if they come into contact with unprotected skin or eyes.

Glass splinters produced by the destruction of xenon bulbs may cause cut injuries in unprotected skin and unprotected eyes.

Risk of poisoning

When xenon bulbs are destroyed, serious health problems may be caused if the mercury vapors produced are inhaled or if mercury compounds or toxic salts are ingested or absorbed through the skin. Possible consequences include nausea, vomiting and gastrointestinal disruptions as well as degradation of the kidneys and the central nervous system. Skin and eye damage may also result.

Safety precautions/instructions

- Persons with electronic implants (e.g. pacemakers) must never work on xenon headlamps.
- Wear safety shoes (with rubber soles).
- Prior to working on xenon headlamps (e.g. replacing parts, hooking up test equipment, etc.), the complete lighting system must be switched off and the xenon headlamps must be disconnected from the on-board electrical system.
- If the xenon headlamps are switched on, never touch components under high voltage.
- If the xenon headlamps are switched on, maintain a clearance of at least 30 mm to components under high voltage.
- Avoid all contact with hot components.
- Wait at least 3 min after switching off xenon bulbs before touching them.
- Do not damage or destroy xenon bulbs.

Safety precautions/instructions

- Never operate xenon bulbs unless they are properly installed in xenon headlamps with UV-absorbing headlamp lenses.
- Keep all highly flammable materials away from working area.
- Wear suitable protective gloves and safety glasses.
- Ensure that the workplace is sufficiently ventilated.

First aid measures

Electrical shock

- Switch off current, bring injured person to safety.
- Immediately notify an emergency physician.
- Perform mouth to mouth respiration, if necessary.
- Perform cardiopulmonary resuscitation, if necessary.

Burn injuries

- Cool affected skin area with cold water.
- Cover burn wounds with sterile dressing.
- Consult a physician.

Cut injuries/skin injuries

- Stop the bleeding.
- Dress cut/skin injury.
- Consult a physician.

Foreign object in eye

- Cover affected eye with a sterile dressing.
- Cover both eyes to calm them.
- Consult an eye doctor immediately.

Eye contact with mercury vapors/toxic salts

- Flush eyes with lukewarm water.
- Cover eye with sterile dressing.
- Consult an eye doctor immediately.

Eye contact with UV light

- Consult an eye doctor immediately.

Poisoning caused by inhaling mercury vapors

- Take victim to fresh air.
- Consult a physician immediately.

Poisoning caused by ingesting toxic salts or mercury compounds

- Consult a physician immediately.

Always consult a medical service or physician after administering first aid.

INJURY HAZARD FROM PINCHING AND CRUSHING, IN EXTREME CASES EXTREMITIES CAN EVEN BE CUT OFF WHEN CAUGHT IN WINDSHIELD WIPER MECHANISM. - AS82.30-Z-0001-01A

Always remove ignition key before working on windshield wiper mechanism.

Injury hazard

When working in the area of the windshield wiper mechanism with the ignition key in position "1" or "2" the wiper arm or wiper linkage can be pushed out of its end position and start running **unintentionally** . This can result in severe injuries by cutting, pinching or crushing body parts.

Rules of behavior/protective measures

- Always remove ignition key before working on windshield wiper mechanism.
- Secure operating range of mechanism against reaching in.
- Keep sufficient distance away from moving parts.
- Supervise hazard area.
- Wear tight fitting clothing and hair net.

TROUBLE DIAGNOSIS

HIGH BEAMS AND/OR LOW BEAMS DO NOT WORK - AF82.10-P-2009B

MODEL 129,140,163,170, 202, 208, 210, 215, 220 with CODE (612) Xenon headlamp unit

Modification notes

4.4.00	Supersedes STIP 82.10-019 from 24.03.2000		

Damage code	Cause	Remedy	
⚠ Danger!	**Risk of death** caused by high voltage levels present at xenon headlamps. **Risk of explosion/risk of fire** caused by highly inflammable substances at damaged xenon bulbs **Risk of injury** caused by UV light, hot components at xenon	Do not come into contact with parts that are under high voltage. Persons with **active electronic implants** (e.g. heart pacemakers) must never work on xenon headlamps. Switch off the complete lighting system. Wear insulated safety shoes, safety glasses and protective gloves. Remove highly inflammable materials from the hazard area.	**AS82.10-Z-0001-01A**

	headlamps and glass splinters from broken xenon bulbs **Risk of poisoning** caused by inhaling mercury vapor and by swallowing/skin contact with toxic salts and mercury compounds	Ensure that the working area is sufficiently ventilated.	
82 119		[i] We receive at the diagnostic centers of the plants more and more xenon control units and xenon lamps which are o.k. To avoid this high number of problem parts with no reproducible faults, we would ask you to use the following procedure for troubleshooting:	
		1 Perform diagnosis according to instructions in WIS. Model 202, 208, 210	AD82.10-P-1001AZ
		[i] If the fault cannot be recognized or the faulty component determined: ? 2 Interchange the xenon lamps (right to left). (!) For the time being do not replace system components.	
		[i] If the fault of the xenon lamp still exists: ? 3 Remove/install/replace xenon lamp.	
		[i] If the fault remains in the headlamp the cause may be the xenon control unit or a fault on the vehicle side.	
		[i] We are aware of the fact that this procedure may possibly lead to another stay in the workshop of the vehicle in question. However, we see no other alternative if the redebiting of warranty and goodwill costs is to be avoided.	

WINDSHIELD WASHER WATER RESERVOIR LEAKY - AF82.35-P-4043B

MODEL 163.113/136/154/172 With 5 L reservoir

Damage code	Cause	Remedy	
	Stress fracture in windshield washer water reservoir.	1 Replace windshield washer water reservoir with large capacity reservoir.	**SM82.35-P-0002GH**

INSTALLING SOUND SYSTEM JUMPER HARNESS - AF82.60-P-1010-01AG

1. Insert sound system jumper harness through radio opening

   i Position jumper harness within cockpit assembly so that jumper harness is routed above HVAC venturi tube and lays across base of steering column.

2. Plug male radio harness connector A/B (1) into corresponding female connector (2) of jumper harness
3. Secure connectors, phone antenna and phone power lead with cable tie (3) next to radio harness mounting clip on HVAC case

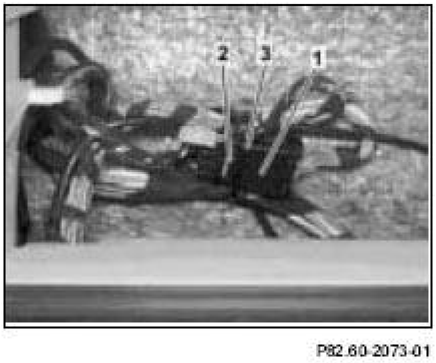
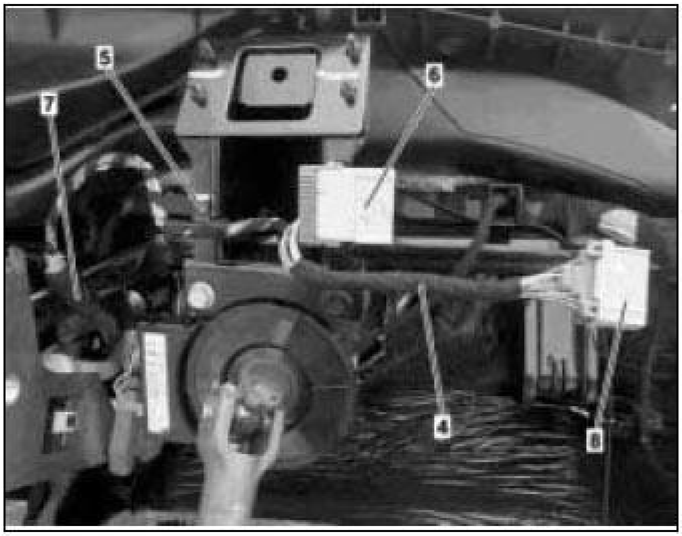


Fig. 98: Identifying Phone Power Lead With Cable Tie, Male Radio Connector And Corresponding Female Connector

4. Attach jumper harness (4) to steering column mounting bracket with integrated harness clip (5) and clip on female amplifier connector (6) of jumper harness
5. Secure jumper harness (4) to dash support bracket with cable tie (7)

   i Install cable tie on convolute tubing protected area of jumper harness.



P82.60-2074-11

Fig. 99: Identifying Female Amplifier Connector, Cable Tie And Harness Clip

6. Cut slot in insulation to access sound system amplifier (A2/13) electrical connectors.
7. Disconnect male connector A/B (9) on sound system amplifier and plug into female amplifier connector (6) of jumper harness
8. Plug male connector A/B (8) of jumper harness into corresponding connection on sound system amplifier
9. Refit insulation



P82.60-2075-11

Fig. 100: Identifying Sound System Amplifier, Plug Male Connector A/B And Integrated Harness Clip

HUMMING SOUND FROM SPEAKERS WITH RADIO SET ON LOW VOLUME - AF82.60-P-1010AG

MODEL 163 with CODE (259) Radio Premium with Bose sound system

Damage code	Cause	Remedy	
	Speaker wires picking up interference noise from surrounding wiring	1 Remove radio	**AR82.60-P-7502EA**
		2 Remove upper center console storage compartment	
		3 Remove lower dash panel below steering column	**AR68.10-P-1500GH**
		4 Install sound system jumper harness	**AF82.60-P-1010-01AG**
		5 Reinstall in opposite order	

Parts ordering notes

Part no.	Designation	Quantity
163 540 98 05	Jumper harness for Bose sound system	1

PROGRAM CHANGE ALTHOUGH RDS [RADIO DATA SYSTEM] AND REGIONALIZATION ARE SWITCHED ON - AF82.60-P-1062A

MODEL 129, 140, 163, 168, 170, 171, 202, 203, 208, 209, 210, 211, 215, 220, 230, 463 with RDS radio

Damage code	Cause	Remedy	
	Station change without obvious cause. [i] Some radio stations which had originally transmitted regional identification have been transmitting the RDS signals without regional identification for some time. Without regional identification it is no longer possible to separate stations with the same station name which transmit different programs.	1 Point out the facts to the customer. [i] Do not replace any devices, state of the art engineering.	

INTERMITTENT INTERRUPTIONS OF RADIO RECEPTION IN RDS MODE - AF82.60-P-1101A

MODELS 163,168,170, 208, 210 with CODE (756a) MB radio Audio 10 RDS with CD compartment

Damage code	Cause	Remedy	
	Under unfavorable reception conditions in FM-RDS mode, the radio may frequently switch to alternative frequencies of one and the same radio station.	[i] Due to the equipment and antenna design there is no remedy available.	
		During switchover, reception may be interrupted for a brief period.	Do not replace any radios subject to this complaint only!

PROBLEM WITH RADIO RECEPTION AFTER INSTALLING SUN SHIELD FILM - AF82.60-P-1105A

MODEL 163, 202, 203, 208, 209, 210, 211, 215, 220

Modification notes

11.2.00	Supersedes STIP 82.60-030 dated 10.2.00		

Damage code	Cause	Remedy	
	Complaint is caused by retrofitting metallized window foils.	**When installing window foils, cut foil outside of vehicle to avoid damaging the antennas and heating wires**	
	[i] Metallized foil: ○ AM reception reduced approx. 70 %, among other problems search stop no longer possible ○ FM reception reduced approx. 10 % . ○ TV reception reduced approx. 10	[i] Do not use metallized foil. Advise customer of negative effects to reception	

	%. ◦ Range of radio remote control for central locking reduced by up 50 % ⓘ Non-metallized foil: ◦ Only slight reduction of functions described above.		

AM RADIO RECEPTION DIFFICULTIES - AF82.60-P-6005A

MODEL 163.136 /154 /172 ## up to 146760

Revisions

01.09.99	Supersedes STI no. 82.60-024 dated 01.09.99		

	Cause	Remedy	
	Loss of noise filtering function of the antenna splitter (A2/5) and the AM/FM amplifier (A2/18) due to poor ground connection.	1 Remove AM/FM amplifier	**AR82.62-P-8347GH**
	ⓘ AM radio reception is being adversely affected by background noise and electrical interference, resulting in the station signal being overridden.	2 Remove antenna splitter	**AR82.70-P-8953GH**
	The painted surface of the vehicle's body, combined with the protective coating on the mounting screws, may not provide an adequate ground.	3 Remove paint/E-coating from vehicle body at mounting points of antenna splitter and AM/FM amplifier 4 Remove protective coating on shoulder of antenna splitter and amplifier mounting screws	

		5 Reinstall antenna splitter	**AR82.70-P-8953GH**
		6 Reinstall AM/FM amplifier	**AR82.62-P-8347GH**

CDS AND DVDS ARE NOT EJECTED - AF82.60-P-6061A

MODEL 129, 140, 163, 168, 170, 171, 202, 203, 208, 209, 210, 211, 215, 220, 230, 414, 463

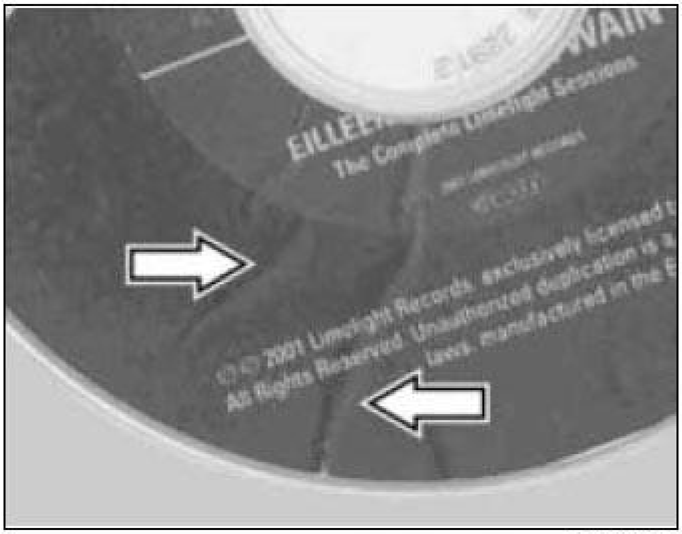
Modification notes

17.5.04	Cause/remedy 3 added		

Damage code	Cause	Remedy	
		i **The causes listed in this document are not a malfunction of the CD drive. Operations in this context are not covered by warranty or goodwill** .	
	Cause 1:	**Remedy 1:**	
	CD thickness is not within tolerance, e.g. DVDs with recordings on both sides (side 1: video data, side 2 audio data). i CD occasionally not pulled in, light pressure required in addition. Then, CD is not ejected. i CD does not satisfy specifications. According to CD standards, the thickness must be within the tolerance range of 1.1 mm -1.5 mm. Previously measured CDs had a thickness of > or = 1.6 mm.	1 Inform customer that CDs should correspond to specifications. i Drives fulfill specifications.	
None	**Cause 2:**	**Remedy 2:**	
	Self-made CDs/DVDs used with self-adhesive labels. i Due to the various materials used, the length expansion differs at higher	1 Advise customers not to use CDs/DVDs with self-adhesive labels. i Please also advise your coworkers in Sales.	

	temperatures causing the label to become wavy (see arrows) or the CD/DVD to deform. In both cases, the CDs/DVDs can get stuck and damage to the drive mechanism is possible. ◦ CDs/DVDs are not ejected. ◦ CDs/DVDs are not completely ejected. All head units with CD/DVD drive, all CD changers as well as navigation processors with single-slot drive are affected.		
None	**Cause 3:**	**Remedy 3:**	
	CDs with a diameter of 8 cm are used (with and without adapter). [i] The pull in/eject mechanism of the drive is Drives not designed for 8 cm CDs. [i] If an adapter is used for 8 cm CDs, the thickness of the CD increases which leads to problems when inserting and ejecting CDs. Furthermore, there is the danger that the 8 cm CD will be pushed out of the adapter while being pulled in/ejected and thereby block the mechanism.	1 Please inform the customer that 8 cm CDs are not to be used (even with an adapter). [i] Drives fulfill specifications.	

Arrow Waves on the CD label



P82.60-4372-11

Fig. 101: Identifying Waves On CD Label

GLOBAL POSITIONING SYSTEM (GPS) MALFUNCTION - AF82.61-P-6010A

MODEL 163.113 /136 /154 /172 /174 #A as of 145273 up to 289564, 163.113 /154 #X as of 708319 up to 754619 with CODE (353) Audio 30 APS

Operation no. of operation texts or standard texts and flat rates

Sector	Op. no.	Operation text	Time	Acc. no.	Code
P	023578	REPLACE REAR ANTENNA FOR GLOBAL POSITIONING SYSTEM (GPS) (AFTER TESTING)	003 AW/0,3 h	82 858 52	-

Damage code	Cause	Remedy	
	Inadequate seal between antenna base and vehicle roof causes antenna connector to corrode. [i] The parts kit for the Global Positioning System (GPS) antenna was updated. Instead of a foam seal (4), a grommet (5) is now used to seal the antenna base to the vehicle roof. The new **163 820 18 75** part	1 Replace GPS antenna. [i] Use new parts kit only.	**AR82.61-P-7474GI**

	number replaces the former **163 820 06 75** part number.		

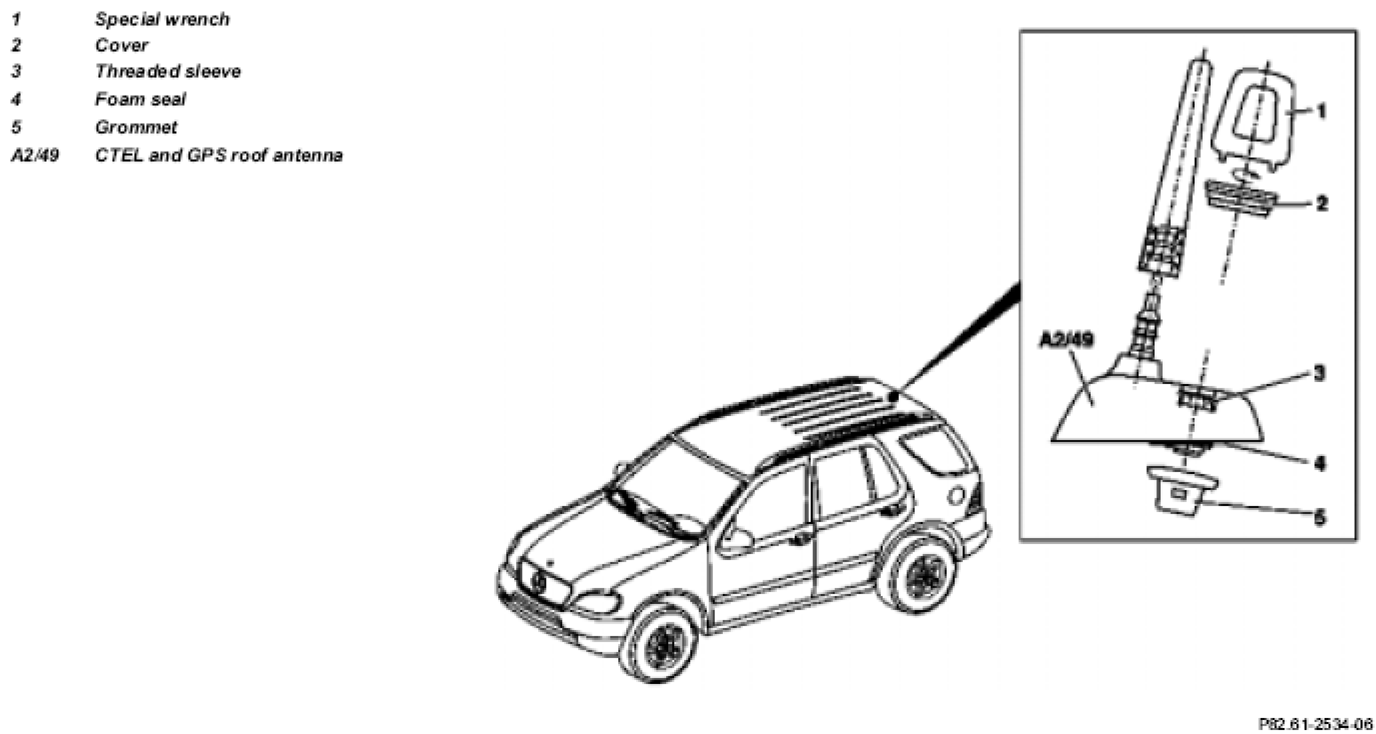


Fig. 102: Identifying GPS Rear Antenna Components

Parts ordering notes

Part no.	**Designation**	**Quantity**
163 820 18 75	Antenna	1

TELEPHONE CALL INTERRUPTED - AF82.70-P-1009A

MODEL 129, 163, 168, 170, 171, 202, 203, 208, 209, 210, 211, 215, 220, 230, 460, 461, 463 with CODE (312) GSM portable cellular telephone with CODE (316) MB GSM cellular telephone (D2B) with CODE (317) GSM portable cellular telephone (D2B) with CODE (347) TELE AID emergency call system (D2B) with CODE (380) Preinstallation for MB phone "CTEL", complete with CODE (381) MB phone "Standard" in console on right side of dome with CODE (382) MB phone "CTEL" in console on right side of dome with CODE (383) With telephone "Standard" in console on right side of dome with integrated TELEAID emergency call system, hands-free system and antenna with CODE (386) Preinstallation for "portable CTEL" UPCI telephone system with CODE (388) "Portable CTEL" UPCI telephone system with CODE (852) CTEL preinstallation assembly at dome with CODE (853) MB standard cellular telephone with CODE (854) MB portable cellular telephone with CODE (855) TELE AID

Damage code	**Cause**	**Remedy**	

	Network is overloaded i The telephone system has been checked technically	i Do not remove/install/replace any parts. It is not necessary to replace the telephone control module due to call interruptions. 1 Ask network provider about traffic at point in question. i If the customer uses a twin card it is necessary to switch off the additionally (externally) operated cellular telephone before the vehicle's telephone system is switched on.	

LOSS OF SOUND IN COMAND SYSTEM AND/OR TELEPHONE NOT FUNCTIONING - AF82.70-P-1090A

MODEL 163, 203, 208, 209, 210, 215, 220, 230, 463 with CODE (853) MB standard cellular telephone

Nokia 6091

Damage code	Cause	Remedy	
	Fixed installation telephone control unit. i Cyclical loss of sound in COMAND system for 2 - 3 seconds (Nokia 6091). Telephone temporarily not functioning.	1 Read out series number. i via the receiver using the key combination: *#06# The series number can also be found on the sticker on the control unit.	
	i Concerns fixed installation control unit part no. A 203 820 70 26. When reading out with STAR DIAGNOSIS (quick test) part no. 000 000 00 00 appears with these control units. Affected Nokia series numbers: from 350109/20/038841/6 up to 350109/20/047721/9	i If the affected series number is installed: ? 2 Remove/install/replace fixed installation telephone control unit.	

Parts ordering notes

Part no.	Designation	Quantity
A 203 820 70 26	Fixed installation telephone control unit	As required

PORTABLE CTEL CANNOT BE OPERATED OVER STEERING WHEEL OR COMAND/RADIO - AF82.70-P-6090A

MODEL 129, 163, 168, 170, 202, 203, 208, 210, 211, 215, 220 with CODE (380) Preinstallation for MB phone "CTEL", complete with CODE (382) MB phone "CTEL" in console on right side of dome with CODE (852) CTEL preinstallation assembly at dome with CODE (854) MB portable cellular telephone with Nokia 6210

Modification notes

12.3.02	Supersedes STIP 82.70-035 dated 14.08.2001	Validity and content updated	

Damage code	**Cause**	**Remedy**	
	Nokia 6210 cannot be operated with current interface	i Operation of Nokia 6210 possible with new interface. Modified interface available. Nokia 6210 portable CTEL software version 4.36 or higher required For model 211 the portable CTEL SW version 5.2 is required.	
		1 Read out Nokia 6210 portable CTEL software version	
		2 Enter *#0000# on Nokia 6210 portable CTEL.	
		i If an older version is installed the portable CTEL must be updated in a Nokia shop. If the customer has stored data in the portable CTEL telephone, it is necessary to secure this in the Nokia shop before updating.	
		3 Remove and install, replace interface.	
		MODEL 203.0 with CODE (854) MB portable CTEL	AR82.70-P-7379EE
		MODEL 215, 220 up to 30.6.00 with CODE (317) D-network portable CTEL (D2B)	AR82.70-P-8920I
		MODEL 210.0 as of	AR82.70-P-7379FB

		1.7.00 with CODE (854) MB portable CTEL	
		MODEL 208.3 as of 1.7.00 with CODE (854) MB portable CTEL	AR82.70-P-7379EA
		[i] Insert interference suppression converter between compensator (A28/3) outlet in direction of portable CTEL holder. [i] Installation location for compensator: ?	
		MODEL 203.0 with CODE (854) MB portable CTEL	AR82.70-P-0010A
		MODEL 208.3 as of 1.7.00 with CODE (854) MB portable CTEL	AR82.70-P-0010AC
		MODEL 210.0 with CODE (854) MB portable CTEL	AR82.70-P-0010B
		MODEL 210.2 with CODE (854) MB portable CTEL	AR82.70-P-0010C
		MODEL 215 as of 1.7.00 with CODE (854) MB portable CTEL	AR82.70-P-0010AD
		MODEL 220 as of 1.7.00 with CODE (854) MB portable CTEL	AR82.70-P-0010AE
		[i] Return removed interface (203 820 32 26) with index ES1 0070 to appropriate ELCs with return slip. To ensure supply of replacement parts we request you to send in the removed interface immediately.	

Parts ordering notes

Part no.	Designation	Quantity
203 820 51 85	Interface	As required

203 820 07 51	Clip for portable CTEL mount	As required
203 820 52 15	Interference suppression converter	As required

COMAND OPERATING AND DISPLAY SYSTEM SCREEN REMAINS DARK AFTER STARTING ENGINE - AF82.85-P-2001A

MODEL 163, 203, 208, 210, 215, 220, 230, 463 with CODE (352) COMAND operating and display system

Damage code	Cause	Remedy	
	Current vehicle voltage.	[i] Do not remove/install COMAND. 1. Point out to customer that in the event of problems the fault can be eliminated by switching off/on (ON/OFF button) the COMAND.	

NAVIGATION SYSTEM DISPLAYS INCORRECT ADDRESS - AF82.85-P-2100A

MODEL 163.154 /174 #A as of 289565, 163.157/175 with CODE (357) Navigation system - additional unit with CODE (494a) USA version

Mainland USA only,

DVD version 2002-2 only

Operation no. of the operation texts or standard texts and flat rates

Range	Op. no.	Operation text	Flat rate	Acc. no.	Code
P	023917	Flash Navigation system	0.3 h	82 853 90	-

Damage code	Cause	Remedy	
	Database mismatch.	1 Start engine.	
		2 Turn on MCS unit.	
		3 Press NAVI MENU button.	
		4 Ensure MAP REGION is set to MAINLAND US under SYSTEM SETUP menu.	
		5 Eject customer Navigation DVD.	

		6 Insert update CD into Navigation unit and close MCS door.	
		7 Follow on-screen instructions until update is complete. DO NOT turn off engine.	
		8 Remove update CD when download is complete. i Disregard error message stating disc cannot be read: There is no map information on the update CD.	
		9 Insert customer Navigation DVD and input any new address to verify accuracy.	

Parts ordering notes

Part no.	Designation	Quantity
T-2787-163	Navigation update CD	1

ERROR IN COMAND OPERATING AND DISPLAY SYSTEM - AF82.85-P-6000-01B

i Error patterns for COMAND update CD 10/2001.

The service update CD COMAND with part number W 215 589 00 22 00 eliminates the following complaints:

- COMAND: A 220 820 37 89

Error patterns:

- Increased quiescent current.
- The personal symbols on the map are not updated during active guidance.
- Voice control does not react to commands
- Occasionally no sound (duration approx. 1 second).

- COMAND: A 203 820 91 89, A 463 820 10 89

Error patterns:

- Increased quiescent current.

- The personal symbols on the map are not updated during active guidance.
- Voice control does not react to commands
- Occasionally no sound (duration approx. 1 second).
- TV screen switches off when standing still
- After switching on CD player plays CD1/track 1 instead of title played last
- No message when CD magazine sticks during ejection
- Wavy interference in navigation display when TV picture is switched off (as if station is not correctly received)
- TCS icons are occasionally not displayed on the map with active dynamic guidance
- Telephone book is not activated.

- COMAND: A 208 820 40 89, A 210 820 54 89, A 163 820 14 89

Error patterns:

- Increased quiescent current.
- The personal symbols on the map are not updated during active guidance.
- Voice control does not react to commands
- No message when CD magazine sticks during ejection
- TCS cannot be activated sporadically.
- Time in instrument cluster and COMAND differs approx. 1-2 seconds.
- COMAND signals CD reading error without any obvious cause

PERFORMING SOFTWARE DOWNLOAD - AF82.85-P-6000-04A

i **COMAND 2.0-ECE / 2.5-ECE - Perform software download of CD:**

Do not start vehicle during download, do not cause other voltage drops in the vehicle electrical system, do not remove CD and do not switch off unit! (Unit will be damaged!)

In the case of erroneous operation of the download control module, the download starts again or is terminated if the old software has not been erased previously.

1. Switch off ignition.
2. Remove navigation CD and insert download CD.
3. Switch off control module.
4. After a waiting time of min. 5 s and with buttons * and # pressed simultaneously, switch on unit.

   i The menu "Service download of CD" appears with menu points "Control module" and "Termination".

5. Select "Start control module" with right knob

[i] The date or the version of the currently stored software and the software on the CD appears in the display.

[i] By pressing the right knob the download is started. After some seconds the system changes to screen "CD ROM software download".

- On the download control module the main processor software is loaded first, then the graphic processor software. Entire duration: approx. 40 minutes
- The download progress is indicated by a bar graph.

[i] In the event of errors an error message is indicated on the display.

When the download is completed, the display switches off for a short time. When it is switched back on again the result of the download is displayed.

6. Remove download CD and reinsert navigation CD.

FAULT IN COMAND OPERATING AND DISPLAY SYSTEM - AF82.85-P-6000N

MODEL 163, 203, 208, 210, 215, 220, 463 with CODE (352a) COMAND operating and display system with CODE (801) Model year 2001

MODEL 414 with CODE (EN4) Auto pilot system with TMC interface, large display with CODE (EN3) Auto pilot system with GSM interface, large display

Modification notes

26.11.01	Supersedes **AF82.85-P-6000N** dated 09.01.2002	Part numbers added and changed	**AF82.85-P-6000-01B**

Operation no. of operation texts or standard texts and flat rates

Category	Op. no.	Operation text	Time	Acc. no.	Code
P	829905	PERFORMING SW UPDATE FOR RADIO/COMAND	003 WU/0.3 h	-	-

Damage code	Cause	Remedy	
	Software error	[i] Error patterns for COMAND update CD 10/2001.	**AF82.85-P-6000-01B**
		1 Perform COMAND update [!] Update only COMAND with the following part numbers. A 163 820 14 89	**AF82.85-P-6000-04A**

		A 203 820 91 89 A 208 820 40 89 A 210 820 54 89 A 220 820 37 89 A 463 820 10 89 [i] CD covers exist with incorrect part number for model series 203. **Do not update part number** **A 203 820 96 89.** [i] The CD should remain in the workshop (service CD) It can be used several times and should not be given to customers! Always order service CD in advance to avoid longer workshop visits!	

Parts ordering notes

Part no.	Designation	Quantity
W 215 589 00 22 00	COMAND service update CD	1

AUDIO SYSTEM FAILS TO MUTE WHEN INCOMING PHONE CALLS RECEIVED - AF82.85-P-6010A

MODEL 163.113 /154 /172 /174 #A as of 221506 up to 289564, 163.113 #X as of 734088 up to 754619 with CODE (352a) COMAND operating and display system with CODE (353) Audio 30 APS with CODE (756b) MB Audio 10 CD radio with TP/RDS with CODE (819a) CD changer with CODE (854) MB portable cellular telephone

Modification notes

17.9.01	Supersedes STI no. 82.85-024 dated 14.9.01		

Damage code	Cause	Remedy	
	Software error in CD changer. [i] On vehicles equipped with Code 352a, 756b or 353 in combination with Code 819a and 854 the audio system may sporadically fail to auto-mute when incoming	1 Inspect CD changer part number [i] If equipped with part number: **163 820 15 89** , then ?	

	phone calls are received.		
		2 Replace CD changer [i] See parts ordering notes.	**AR82.64-P-7507GH**

Parts ordering notes

Part no.	**Designation**	**Quantity**
163 820 38 89	CD changer	1

NAVIGATION SYSTEM ERRONEOUS OR NO GUIDANCE - AF82.85-P-6061A

MODEL 163, 168, 170, 203, 208, 209, 210, 211, 215, 220, 230, 414, 463

Damage code	**Cause**	**Remedy**	
	Defective digitization of map material Possible switch-off or falsification of GPS signals during worldwide crisis	1 Perform test drive with other vehicle [i] This must be compared with the same navigation system and the same version of navigation CD.	
	[i] The satellite signal includes the time at which the signal was sent The navigation processor Calculate the transmission time of the signal resulting from the satellite position and the transmission time of the GPS signal and can therefore determine the vehicle position (min. 3 satellites). If the GPS signal is falsified the transmitted time from the satellites is changed. A change of 10 ns corresponds to approx. 3 m position change	[i] If the complaint is still present: ? 2 Perform test drive with new navigation CD version. [i] When the complaint is eliminated, use new navigation CD.	
		[i] If the complaint is still present: ? 3 Perform test drive with other vehicle and navigation system of	

		other manufacturer.	
		i If the complaint does not occur during the test drive, a digitization error on the navigation CD is present: ? 4 Inform customers of facts and manufacturer of CD with report form i If the correct report form from the manufacturer is not available, please contact corresponding service center (telephone number is given on label of navigation CD):	
		5 Check antenna system for proper function and repair according to condition.	
		i If the antenna system is okay and errors also occur on other vehicles: ? 6 Inform customer that the GPS system is operated by the US military	

MCS MALFUNCTION - OCCASIONAL FAILURE OF STARGUIDE, SOUND OR CD CHANGER. DTC'S N1111, N1112, N1116 - AF82.95-P-6002A

MODEL 163.157 /174 /175 #A as of 409851 up to 419036 with CODE (349) E Call emergency call system with CODE (522) Modular control system (MCS) radio USA

Operation no. of operation texts or standard texts and flat rates

Range	Op. no.	Operation text	Time	Acc. no.	Code
P	023843	FLASH TELEAID EMERGENCY CALL SYSTEM CONTROL MODULE	008 WU/0.7 h	82 876 90	-

Damage code	Cause	Remedy	
	Data transmission of D2B ring is interrupted. The E-call control module is in a	Recode E-call control module: ?	

	bypass mode. ⓘ The E-call control module is not recognized by the D2B ring. The emergency call function is not affected, this function is INDEPENDENT of the D2B ring.	1 Connect STAR-DIAGNOSIS.	
		2 Select "Information and communication" in the "Control module" menu	
		3 Select "TELE AID, E-call or telephone - telematic system (K-line)".	
		4 Select "Control module version".	
		5 Check "Software version". ⓘ If the "software version" has the status of **04/03** , NO FURTHER STEPS ARE REQUIRED. If "Software version" has the status of **02/02** ? 6 Select "Program control module according to factory data" in "TELE AID" menu.	
		7 Follow instructions until procedure is completed. ⓘ Complete DAS and remove before SOS button is pressed.	
		8 Connect STAR-DIAGNOSIS.	
		9 Perform short test and erase all DTC's. ⓘ DTC's are stored in MCS and E-call control module.	
		10 Select "Control module version" and "Software version" in "TELE AID"	

		menu and ensure that software status **04/03** is available.	
		11 Complete DAS and finish STAR-DIAGNOSIS.	

SELF-DIAGNOSTIC SYSTEM

INTERIOR LIGHTS DIAGNOSIS CONTENTS - AD82.20-P-1000GHZ

MODEL 163

A2.20 [] 11b	Interior lighting diagnosis, previous knowledge		**AD82.20-P-2000GH**
A2.2 [] 12b	Interior lighting diagnosis, function check		**AD82.20-P-3000GH**
A2.2 [] 14b	Interior lighting diagnosis, troubleshooting		**AD82.20-P-5000GH**
A2.2 [] 21b	Interior lighting diagnosis, testing electrical system		**AD82.20-P-6000GH**

INTERIOR LIGHTS DIAGNOSIS PREVIOUS KNOWLEDGE - AD82.20-P-2000GH

MODEL 163

GF	Function description, interior lighting		**GF82.20-P-0002GH**
GF	Location of components, interior lighting		**GF82.20-P-0002-01GH**
PE	Electric wiring diagram, interior lighting		PE82.20-P-2000G
PE	Inter-function groups of wiring diagrams		PE00.19-P-1100E
	Connection and use of test equipment		**AD00.00-P-1000AZ**
	Diagnostic tools, interior lighting		**AD54.21-P-2000-01GH**
	Assignment of coupling on door separation points		**AD72.29-P-2000-03GH**

INTERIOR LIGHTS DIAGNOSIS OPERATIONAL CHECK - AD82.20-P-3000GH

MODEL 163

	Location of components, interior lighting		**GF82.20-P-0002-01GH**
	Interior lighting diagnosis, previous knowledge		**AD82.20-P-2000GH**
I	Battery voltage 11-14 V		
II	Fuses in order		
III	AMM voltage supply in order		**AD54.21-P-6000-01GH**
IV	Lighting equipment in order		
	Function check		
Scope of test	**Operation/Requirement**	**Specified value**	**Possible cause/ Remedy**
1 Switch on front interior lighting manually	All doors closed, operate switch on front dome lamp (with shut-off delay and front reading lamp)(E15/2).	Front dome lamp (with shut-off delay and front reading lamp) (E15/2) illuminated	Cables E15/2
2 Switch on right rear interior lighting manually	All doors closed, operate switch on right rear dome lamp (E15/9).	Right rear dome lamp (E15/9) illuminated	Cables E15/9
3 Switch on left rear interior lighting manually	All doors closed, operate switch on left rear dome lamp (E15/8).	Left rear dome lamp (E15/8) illuminated	Cables E15/8
4 Switch on interior lighting by opening a front door	All doors closed, all interior lamps OFF, open left front or right front door.	Front dome lamp (with shut-off delay and front reading lamp) (E15/2), left rear dome lamp (E15/8) and right rear dome lamp (E15/9) dimmed	Rotary tumbler microswitch **AD80.20-P-6001-39GH** Interior lamps **AD82.20-P-5000GH** Cables All-Activity Module (AAM) (N10)
5 Switch on interior lighting by opening a rear door	All doors closed, all interior lamps OFF, open left rear or right rear door.	Left rear dome lamp (E15/8) and right rear dome lamp (E15/9) dimmed	Rotary tumbler microswitch **AD80.20-P-6001-40GH** Interior lamps **AD82.20-P-5000GH** Cables All-Activity Module (AAM) (N10)
6 Switch on interior lighting by unlocking	Central locking in order All doors closed and locked, all interior lamps	Front dome lamp (with shut-off delay	All-Activity Module (AAM) (N10)

vehicle	OFF, unlock vehicle with transmitter key.	and front reading lamp) (E15/2), left rear dome lamp (E15/8) and right rear dome lamp (E15/9) dimmed	
7 Switch on interior lighting by switching off ignition	All doors closed, all interior lamps OFF, ignition OFF.	Front dome lamp (with shut-off delay and front reading lamp) (E15/2), left rear dome lamp (E15/8) and right rear dome lamp (E15/9) dimmed	All-Activity Module (AAM) (N10)
8 Switch off interior lighting by switching on ignition	All doors closed, interior lighting switched on by opening a front door, ignition ON.	Front dome lamp (with shut-off delay and front reading lamp) (E15/2), left rear dome lamp (E15/8) and right rear dome lamp (E15/9) dimmed	All-Activity Module (AAM) (N10)
9 Switch on rear interior lighting manually	Switch on rear dome lamp (E15/3) in "ON continuously" position.	Rear dome lamp (E15/3) illuminated	**AD82.20-P-6000-03GH** E15/3
10 Rear interior lighting switches on automatically	Switch on rear dome lamp (E15/3) in "Automatic" position, open rear doors.	Rear dome lamp (E15/3) illuminated	**AD80.20-P-6001-40GH** **AD82.20-P-6000-03GH** E15/3

INTERIOR LIGHTS DIAGNOSIS TROUBLESHOOTING - AD82.20-P-5000GH

MODEL 163

GF	Location of components, interior lighting		**GF82.20-P-0002-01GH**
	Fuses in order		
I	Battery voltage 11-14 V		
II	AMM voltage supply in order		**AD54.21-P-6000-01GH**
III	Lighting equipment in order		
	Troubleshooting		
Complaint	**Possible cause**	**Notes**	**Remedy/Test step**
Interior lighting	Cables		Voltage supply

inoperative			Terminal 30
Interior lighting does not switch off with ignition "ON", or does not switch on with ignition "OFF"	All-Activity Module (AAM) (N10)		N10
Malfunctions **only when switched on automatically** (by opening the doors):			
None of the interior lights come on when one of the front doors is opened	Left front door rotary tumbler microswitch (S87/7) Right front rotary tumbler microswitch (S87/6) All-Activity Module (AAM) (N10)		**AD80.20-P-6001-39GH** Cables N10
Rear interior lighting does not come on when one of the rear doors is opened	Left rear door rotary tumbler microswitch (S87/2) Right rear door rotary tumbler microswitch (S87/3) All-Activity Module (AAM) (N10)		**AD80.20-P-6001-40GH** Cables N10
Front dome lamp (with shut-off delay and front reading lamp) (E15/2) does not come on when the front doors are opened.	Front dome lamp (with shut-off delay and front reading lamp) (E15/2)		**AD82.20-P-6000-01GH** E15/2
Left rear dome lamp (E15/8) does not come on when the doors are opened	Left rear dome lamp (E15/8) All-Activity Module (AAM) (N10)	If E15/9 functions: otherwise:	E15/8 **AD82.20-P-6000-02GH**
Right rear dome lamp (E15/9) does not come on when the doors are opened	Right rear dome lamp (E15/9) All-Activity Module (AAM) (N10)	If E15/8 functions: otherwise:	E15/9 **AD82.20-P-6000-02GH**
Malfunctions **of individual lamps only** (when switched on automatically and manually)			
Front dome lamp (with shut-off delay and front reading lamp) (E15/2) inoperative	Front dome lamp (with shut-off delay and front reading lamp)(E15/2)		Cables, E15/2

Left rear dome lamp (E15/8) inoperative	Left rear dome lamp (E15/8)		Cables, E15/8
Right rear dome lamp (E15/9) inoperative	Right rear dome lamp (E15/9)		Cables, E15/9
Interior lighting does not come on when central locking is unlocked		Central locking in order	Cables N10
Malfunctions of rear dome lamp (E15/3):			
Rear dome lamp (E15/3) inoperative	Rotary tumbler/trunk lid microswitch (S88/1) Rear dome lamp (E15/3)		**AD82.20-P-6000-03GH** **AD80.20-P-6001-44GH**

INTERIOR LIGHTS TEST OF ELECTRICAL SYSTEM FRONT DOME LAMP - AD82.20-P-6000-01GH

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Front dome lamp (with shut-off delay and front reading lamp) (E15/2)** Automatic actuation	C — E15/2 (V) — B	Disconnect coupling on (E15/2). actuation of interior lighting "Dome lamp ON".	11-14 V	• Cables • All-Activity Module (AAM) (N10)

Fig. 103: Interior Lights Test Of Electrical System Front Dome Lamp

INTERIOR LIGHTS TEST OF ELECTRICAL SYSTEM REAR LAMPS - AD82.20-P-6000-02GH

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Left rear dome lamp (E15/8)** Automatic actuation	C — E15/8 (V) — B	Actual value Interior lighting "Rear lamps ON"	11-14 V	• Cables
1.1	**Right rear dome lamp (E15/9)** Automatic actuation	C — E15/9 (V) — B	Actual value Interior lighting "Rear lamps ON"	11-14 V	• Cables • All-Activity Module (AAM) (N10)

Fig. 104: Interior Lights Test Of Electrical System Rear Lamps

INTERIOR LIGHTS TEST OF ELECTRICAL SYSTEM REAR DOME LAMP - AD82.20-P-6000-03GH

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Rear dome lamp (E15/3)** Voltage supply	A — E15/3 (V) — B		11-14 V	• Cables
1.1	**Rear dome lamp (E15/3)** Automatic actuation	C — E15/3 (V) — B	Tailgate closed	11-14 V	• Cables

Fig. 105: Interior Lights Test Of Electrical System Rear Dome Lamp

INTERIOR LIGHTS TEST OF ELECTRICAL SYSTEM - AD82.20-P-6000GH

MODEL 163

	Connection and use of test equipment		**AD00.00-P-1000AZ**
	Interior lighting diagnosis, previous knowledge		**AD82.20-P-2000GH**
I	AAM voltage supply in order		**AD54.21-P-6000GH**
II	Battery voltage 11-14 V		
III	Fuses in order		
i	Lighting equipment in order		
	Testing		
1	Front dome lamp, testing electrical system of interior lighting		**AD82.20-P-6000-01GH**
2	Rear lamps, testing electrical system of interior lighting		**AD82.20-P-6000-02GH**
3	Rear dome lamp, testing electrical system of interior lighting		**AD82.20-P-6000-03GH**
4	Front doors rotary tumbler microswitch		**AD80.20-P-6001-39GH**
5	Rear doors rotary tumbler microswitch		**AD80.20-P-6001-40GH**
6	Tailgate rotary tumbler microswitch		**AD80.20-P-6001-44GH**

WIPER SYSTEM DIAGNOSIS CONTENTS - AD82.30-P-1002GHZ

MODEL 163

A2.2 [] 11a	Wiper system diagnosis, previous knowledge		**AD82.30-P-2002GH**
A2.2 [] 12a	Wiper system diagnosis, function check		**AD82.30-P-3002GH**
A2.2 [] 14a	Wiper system diagnosis, troubleshooting		**AD82.30-P-5002GH**
A2.2 [] 21a	Wiper system, testing electrical system		**AD82.30-P-6002GH**

WIPER SYSTEM DIAGNOSIS PREVIOUS KNOWLEDGE - AD82.30-P-2002GH

MODEL 163

⚠ Danger!	Risk of injury due to getting jammed or crushed in extreme cases due to limbs being severed by coming into contact with the windshield wiper mechanism	Always remove the ignition key when working on the windshield wiper mechanism.	**AS82.30-Z-0001-01A**
GF	Location of components, front screen wiper system		**GF82.30-P-0005-01GH**
GF	Location of components, rear screen wiper system		**GF82.30-P-0004-01GH**
GF	Function description, wiper system		**GF82.30-P-0003GH**
PE	Electric wiring diagram, wiper system		PE82.30-P-2000F
PE	Inter-function groups of wiring diagrams		PE00.19-P-1100E
	Connection and use of test equipment		**AD00.00-P-1000AZ**
	Diagnostic tools, wiper system		**AD54.21-P-2000-01GH**

WIPER SYSTEM DIAGNOSIS OPERATIONAL CHECK - AD82.30-P-3002GH

MODEL 163

	Location of components, wiper system	Rear screen wiper system Front screen wiper system	&(**GF82.30-P-0004-01GH**) &(**GF82.30-P-0005-01GH**)
	Wiper system diagnosis, previous knowledge		**AD82.30-P-2002GH**
	Prerequisites for function check		
I	Battery voltage 11-14V		
II	Fuses in order		
III	AAM voltage supply in order		**AD54.21-P-6000-01GH**
IV	Ignition (terminal 15) ON		
	Function check		
Scope of test	**Operation/requirement**	**Specified value**	**Possible cause/**

			Remedy
1 Tip wiping	Combination switch (S4) in "Tip wiping" position	Wiper runs at slower speed, **while** S4 is operated	Cables **AD82.30-P-6002-09GH** **AD82.30-P-6002-02GH**
2 Front screen wiping Stage 1	Combination switch (S4) in "Wiping stage 1" position	Wiper runs at slow speed	Cables **AD82.30-P-6002-09GH** **AD82.30-P-6002-02GH**
3 Front screen wiping Stage 2	Combination switch (S4) in "Wiping stage 2" position	Wiper runs quickly	Cables **AD82.30-P-6002-09GH** **AD82.30-P-6002-02GH**
4 Front screen intermittent wiping	Combination switch (S4) in "Intermittent wiping" position.	Wiper runs, an interval of approx. 5 seconds follows each complete wiping process	Cables Intermittent wiper control **AD82.30-P-6002-01GH**
5 Front screen washing	Combination switch (S4) in "Washing" position	Windshield washer pump (M5/1) operates while S4 is actuated, the wiper carries out three more wiper processes after the switch is released	Cables **AD82.30-P-6002-10GH** **AD82.30-P-6002-04GH** **AD82.30-P-6002-02GH**
6 Rear screen intermittent wipe	Operate "Rear screen intermittent wipe" on rear window wiper/washer switch (S78).	Rear wiper runs, an interval of approx. 5 seconds follows each complete wiping process	Cables **AD82.30-P-6002-06GH** **AD82.30-P-6002-08GH**
7 Rear screen washing	Operate "Rear screen intermittent wipe" on rear window wiper/washer switch (S78).	The rear window washer pump (M5/3) operates while S78 is operated, the wiper carries on wiping for 3 seconds after the switch is released and then stops in the rest position	Cables **AD82.30-P-6002-06GH** **AD82.30-P-6002-08GH** **AD82.30-P-6002-05GH**

WIPER SYSTEM DIAGNOSIS TROUBLESHOOTING - AD82.30-P-5002GH

MODEL 163

	Location of components, wiper system	Front screen Rear screen	&(**GF82.30-P-0005-01GH**) &(**GF82.30-P-0004-01GH**)
	Battery voltage 11-14 V		
◁◗	Fuses in order		
	AAM voltage supply in order		**AD54.21-P-6000-01GH**
	Troubleshooting		
Complaint	**Possible cause**	**Notes**	**Remedy/Test step**
Front wiper system inoperative	Combination switch (S4) Wiper motor (M6/1)		**AD82.30-P-6002-09GH** **AD82.30-P-6002-02GH, cables**
Front wiper does not function when washing front screen	Wiper motor (M6/1)		**AD82.30-P-6002-02GH**
Windshield washer pump does not function when washing front screen	Windshield washer pump (M5/1)		**AD82.30-P-6002-04GH**
Front wiper does not function in wiping stage 1 or stage 2	Combination switch (S4) Wiper motor (M6/1)		**AD82.30-P-6002-09GH** **AD82.30-P-6002-02GH**
Front wiper does not function with intermittent wiping	Combination switch (S4) All-Activity Module (AAM) (N10)		**AD82.30-P-6002-01GH**
Front wiper does not stop in rest position when switched off.	Cam-operated switch on wiper motor (M6/1)		**AD82.30-P-6002-07GH**
Rear wiper system inoperative	Rear window wiper/washer switch (S78) All-Activity Module (AAM) (N10)		**AD82.30-P-6002-06GH**
Rear window wiper inoperative	Rear window wiper/washer switch (S78) Rear window wiper motor inoperative (M6/4)		**AD82.30-P-6002-06GH** **AD82.30-P-6002-08GH**
Rear window wiper does not function when washing rear window	Rear window wiper/washer switch (S78)		**AD82.30-P-6002-06GH**
Rear window wiper cannot be switched off	Rear window wiper motor relay (M6/4)		**AD82.30-P-6002-03GH, cables**

	Cam-operated switch		
Rear window wiper does not complete a wiping movement	Cam-operated switch on rear window wiper motor (M6/4)		**AD82.30-P-6002-03GH**
Rear window washer pump does not function when washing rear window	Rear window wiper/washer switch (S78)		**AD82.30-P-6002-06GH**
	Rear window washer pump (M5/3)		**AD82.30-P-6002-05GH**

WIPER SYSTEM TEST OF ELECTRICAL SYSTEM INTERMITTENT WIPE - AD82.30-P-6002-01GH

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Front wiper "Intermittent switch"** HHT actual value		Combination switch (S4) in "Intermittent wipe" position	ON	• S4
1.1	**Wiper relay (F1k17)** Actuation		Actuation of "Front wiper ON relay"	Relay switches audibly	⇒1.4
1.2	**Wiper motor (M6/1) intermittent wipe switch position** Actuation	30 — F1k17 — 87	Disconnect relay, combination switch (S4) in "Intermittent wipe" position	Motor runs	Value in order: • F1k17 Value not in order: ⇒1.3
1.3	**Wiper motor (M6/1) OFF switch position** Actuation	30 — F1k17 — 87	Disconnect relay, combination switch (S4) in "OFF" position	Motor runs	Value in order: • S4 Value not in order: • Cable • S4 • Wiper motor (M6/1)
1.4	**Wiper relay (F1k17)** Actuation voltage	85 — F1k17 — 86 − V +	Actuation of "Front wiper ON relay"	11-14 V	Value in order: • F1k17 Value not in order: • Cable • All-Activity Module (AAM) (N10)

Fig. 106: Wiper System Test Of Electrical System Intermittent Wipe

WIPER SYSTEM TEST OF ELECTRICAL SYSTEM WIPER MOTOR - AD82.30-P-6002-02GH

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Wiper motor (M6/1)** **Stage 1** Voltage supply	5 M6/1 V 4	Disconnect coupling, move combination switch (S4) into "Wiping stage 1" position.	11-14 V	• Cables
1.1	**Wiper motor (M6/1)** **Stage 2** Voltage supply	5 M6/1 V 3	Disconnect coupling, move combination switch (S4) into "Wiping stage 2" position	11-14 V	• Cables
1.2	**Wiper motor (M6/1)** **Stage 1** Actuation	M6/1 5 4	Disconnect coupling, move combination switch (S4) into "Wiping stage 1" position. **Danger!** **&.3.1.(** AH82.30-P-6100-01Z) Use fuse cable 124 589 37 63 00 for battery connection	Motor runs slowly	• Wiper motor (M6/1)
1.3	**Wiper motor (M6/1)** **Stage 2** Actuation	M6/1 5 3	Disconnect coupling, move combination switch (S4) into "Wiping stage 1" position. **Danger!** **&.3.2.(** AH82.30-P-6100-01Z) Use fuse cable 124 589 37 63 00 for battery connection	Motor runs quickly	• Wiper motor (M6/1)

Fig. 107: Wiper System Test Of Electrical System Wiper Motor

WIPER SYSTEM TEST OF ELECTRICAL SYSTEM TAILGATE WIPER RELAY - AD82.30-P-6002-03GH

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Rear window wiper motor (M6/4)** Actuation	30 M6/4k1 87	Ignition: **ON** Disconnect tailgate wiper motor relay (M6/4k1). **Danger!** **&.3.1.(** AH82.30-P-6100-01Z) Use fuse cable 124 589 37 63 00 for battery connection	Motor runs	• M6/4
1.1	**Rear window wiper motor (M6/4)** Test cam-operated switch	30 M6/4k1 87a	Move motor out of rest position, as in 1.0 **Danger!** **&.3.2.(** AH82.30-P-6100-01Z) Use fuse cable 124 589 37 63 00 for battery connection	Motor remains in rest position	• Cam-operated switch on M6/4

Fig. 108: Wiper System Test Of Electrical System Tailgate Wiper Relay

WIPER SYSTEM TEST OF ELECTRICAL SYSTEM WASHER PUMP - AD82.30-P-6002-04GH

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Windshield washer pump (M5/1)** Function	+ M5/1 1 2	Disconnect plug on motor. Use fuse cable 124 589 37 63 00 for battery connection	Motor runs	• M5/1

Fig. 109: Wiper System Test Of Electrical System Washer Pump

WIPER SYSTEM TEST OF ELECTRICAL SYSTEM TAILGATE WASHER PUMP - AD82.30-P-6002-05GH

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Rear window washer pump (M5/3)** Function	+ M5/3 1 2	Disconnect plug on motor Use fuse cable 124 589 37 63 00 for battery connection	M5/3 runs	• M5/3

Fig. 110: Wiper System Test Of Electrical System Tailgate Washer Pump

WIPER SYSTEM TEST OF ELECTRICAL SYSTEM REAR WINDOW WIPER/WASHER SWITCH - AD82.30-P-6002-06GH

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Rear window wiper/ washer switch Intermittent** HHT actual value		Ignition: ON Rear window wiper/washer switch (S78) in "Intermittent wipe" position.	0/1	Value in order: ⇒1.1 Value not in order: ⇒ 1.2
1.1	**Rear window wiper/ washer switch Wash** HHT actual value		Ignition: ON, rear window wiper/washer switch (S78) in "Wash" position.	0/1	Value in order: ⇒No fault Value not in order: ⇒ 1.2
1.2	**Voltage supply**	4 S87 V	Ignition ON	11-14 V	Value in order: • Rear window wiper/washer switch (S78) Value not in order: • Cable

Fig. 111: Wiper System Test Of Electrical System Rear Window Wiper/Washer Switch

WIPER SYSTEM TEST OF ELECTRICAL SYSTEM CAM SWITCH - AD82.30-P-6002-07GH

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Front wiper terminal 31**		Combination switch (S4) in	ON, OFF when passing	• Cables

	b HHT actual value		"Wipe stage 1" position.	through rest position	• Cam-operated switch on wiper motor (M6/1)

WIPER SYSTEM TEST OF ELECTRICAL SYSTEM TAILGATE WIPER MOTOR - AD82.30-P-6002-08GH

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Rear window wiper motor (M6/4)** Voltage supply	1 M6/4 2 V	Disconnect coupling Ignition ON.	11-14 V	• Cables
1.1	**Trunk lid wiper motor relay (M6/4k1)** Actuation	3 M6/4 2 V 1 kΩ	Coupling disconnected, actuation of wiper "Rear wiper relay ON". Resistance of 1 kΩ in parallel with measuring instrument.	11-14 V	• Cables • N10
1.2	**Rear window wiper motor (M6/4)** Actuation	M6/4 1 M6/4k1 30	Disconnect plug on motor and remove relay. **Danger!** **&.3.1.**(AH82.30-P-6100-01Z) Use fuse cable 124 589 37 63 00 for the battery connection!	Motor runs	Value in order: • Relay M6/4k1 Value not in order: • Rear window wiper motor (M6/4)

Fig. 112: Wiper System Test Of Electrical System Tailgate Wiper Motor

WIPER SYSTEM TEST OF ELECTRICAL SYSTEM WIPER POSITIONS COMBINATION SWITCH - AD82.30-P-6002-09GH

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Rest position** Contact 1	15 19	Combination switch (S4) in rest position	< 1 ohms	• S4
1.1	**Intermittent wipe** Contact 2	15 19	Combination switch (S4) in "Intermittent wipe" position	< 1 ohms	• S4
1.2	**Tip wipe** Contact	15 18	Combination switch (S4) in "Tip wipe" position	< 1 ohms	• S4
1.3	**Wipe stage 1** Contact	15 18	Combination switch (S4) in "Wipe stage 1" pos.	< 1 ohms	• S4
1.4	**Wipe stage**	17 18	Combination	< 1 ohms	• S4

	2 Contact		switch (S4) in "Wipe stage 2" pos.		
1.5	**Intermittent wipe** Contact 1	16 18	Combination switch (S4) in "Intermittent wipe" position	< 1 ohms	• S4

WIPER SYSTEM TEST OF ELECTRICAL SYSTEM WASHER POSITION COMBINATION SWITCH - AD82.30-P-6002-10GH

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Wash** Contact	20 18	Combination switch (S4) in "Wash" position	< 1 ohms	• S4

WIPER SYSTEM TEST OF ELECTRICAL SYSTEM - AD82.30-P-6002GH

MODEL 163

	Connection and use of test equipment		**AD00.00-P-1000AZ**
	Wiper system diagnosis, previous knowledge		**AD82.30-P-2002GH**
I	AAM voltage supply in order		**AD54.21-P-6000GH**
II	Battery voltage 11-14V		
III	Fuses in order		
i	Ignition (terminal 15) ON		
Danger!	**Risk of injury** due to getting jammed or crushed in extreme cases due to limbs being severed by coming into contact with the windshield wiper mechanism	Always remove the ignition key when working on the windshield wiper mechanism.	**AS82.30-Z-0001-01A**
	Testing		
1	Combination switch wiper positions, testing electrical system of wiper system		**AD82.30-P-6002-09GH**
2	Combination switch wash positions, testing		**AD82.30-P-6002-10GH**

	electrical system of wiper system		
3	Intermittent wiper control, testing electrical system of wiper system		**AD82.30-P-6002-01GH**
4	Cam-operated switch, testing electrical system of wiper system		**AD82.30-P-6002-07GH**
5	Wiper motor, testing electrical system of wiper system		**AD82.30-P-6002-02GH**
6	Washer pump, testing electrical system of wiper system		**AD82.30-P-6002-04GH**
7	Trunk lid washer pump, testing electrical system of wiper system		**AD82.30-P-6002-05GH**
8	Trunk lid wiper relay, testing electrical system of wiper system		**AD82.30-P-6002-03GH**
9	Rear window wiper/washer switch, testing electrical system of wiper system		**AD82.30-P-6002-06GH**
10	Trunk lid wiper motor, testing electrical system of wiper system		**AD82.30-P-6002-08GH**

RADIO (RD) DIAGNOSIS, CONTENTS - AD82.60-P-1000AZ

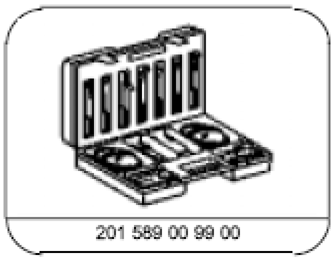
MODEL 124, 129, 140, 163, 168, 170, 202, 208, 210 with MB radio

MODEL 129, 140, 168, 170, 202, 208, 210 with MB radio and navigation operating unit, APS

I 3.1 [] 11	Radio (RD) diagnosis, advanced information		**AD82.60-P-2000A**
I 3.1 [] 12	Radio (RD) diagnosis, function check		**AD82.60-P-3000A**
I 3.1 [] 13	Radio (RD) diagnosis, DTC memory	Models 129, 170, 202, 208, 210 as of 01.06.98 with digital data bus (D2B)	AD82.60-P-4000A
I 3.1 [] 14	Radio (RD) diagnosis, troubleshooting		**AD82.60-P-5000A**
I 3.1 [] 21	Radio (RD), testing		**AD82.60-P-6000A**

	electrical system		

TOOLS, TESTING ELECTRICAL SYSTEM, RADIO (RD) - AD82.60-P-2000-01A



Electrical connecting set

Fig. 113: Identifying Electrical Connecting Set (201 589 00 99 00)

Commercially available tools

Number	Designation
WH58.30-Z-1006-09A	Function generator

CONNECTIONS FOR RADIO, TESTING ELECTRICAL SYSTEM, RADIO (RD) - AD82.60-P-2000-02A

MB radio in models 129, 168, 170, 202, 208, 210 up to 31.05.98 and models 140, 163

A

1 *Speed-sensitive loudness control (except radio model 163)*

1 *Loudspeaker signal telephone (radio model 163)*

2 *Control output for automatic antenna (Japan only)*

3 *Telephone mute circuit*

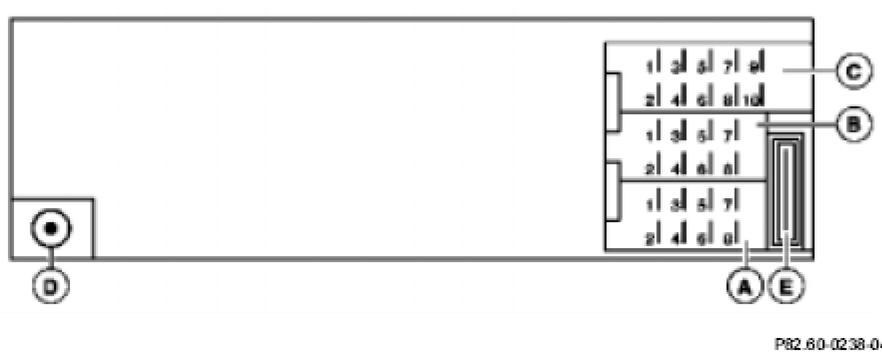
4 *Permanent positive (terminal 30)*

5 *Control output for automatic antenna (except Japan) and control output for left/right audio power amplifier (N40/3) control module*

6 *Illumination (terminal 58)*

7 *Switched positive (terminal 15)*

8 *Ground (terminal 31)*



B

1 *Right rear loudspeaker +*

2 *Right rear loudspeaker -*

3 *Right front loudspeaker +*

4 *Right front loudspeaker -*

5 *Left front loudspeaker +*

6 *Left front loudspeaker -*

7 *Left rear loudspeaker +*

8 *Left rear loudspeaker -*

C

Connection socket for CD changer (except Classic and Spezial with CD magazine compartment), coding (via cable set)

D

Antenna socket

E

Fuse

Fig. 114: Identifying Socket Connections For Radio

RADIO (RD) DIAGNOSIS ADVANCED INFORMATION - AD82.60-P-2000A

MODEL 124, 129, 140, 163, 168, 170, 202, 208, 210 with MB radio

MODEL 129, 140, 168, 170, 202, 208, 210 with MB radio and navigation operating unit, APS

GF	Radio (RD), location of controls	MB Classic radio with traffic news decoder, with RDS up to 08/95	GF82.60-P-0001-02A
		MB Classic radio with traffic news decoder, with RDS as of 09/95 up to 01/97	GF82.60-P-0001-02B
		MB Special radio with traffic news decoder, with RDS up to 05/98	GF82.60-P-0001-02C
		MB Special radio with CD compartment up to 05/98	GF82.60-P-0001-02D
		MB Exquisite radio with traffic news decoder, with RDS up to 05/98	GF82.60-P-0001-02E
		MB Exquisite radio with traffic news decoder, with RDS (J)	GF82.60-P-0001-02F
		MB APS radio and navigation operating unit up to 12/97	GF82.60-P-0001-02G
		MB Audio 5 radio with traffic news decoder, with RDS	GF82.60-P-0001-02H
		MB Hi-line radio (USA)	**GF82.60-P-0001-02I**
		MB Premium radio (USA)	**GF82.60-P-0001-02J**
		MB ML 5 Audio radio	**GF82.60-P-0001-02K**
		MB ML 10 Audio radio	**GF82.60-P-0001-02L**
		MB APS radio and navigation operating unit as of 01/98	GF82.60-P-0001-02M
		MB Radio Audio 10 RDS as of 06/98 up to 06/99	GF82.60-P-0001-02N
		MB Audio 10 RDS radio with CD compartment as of 06/98	GF82.60-P-0001-02O

		MB Radio Audio 30 RDS as of 06/98	GF82.60-P-0001-02P
		MB Audio 30 APS radio	**GF82.61-P-0002-03A**
		MB Radio Audio 10 RDS as of 07/99	GF82.60-P-0001-02T
GF	Location and assignment of cables and connectors	Model 168	GF00.19-P-1000GC
		Model 170	GF00.19-P-1000B
PE	Summary of electric wiring diagrams	Model 208	PE82.00-P-1100D
		Model 202	PE82.00-P-1100D
		Model 163	PE82.00-P-1100E
		Model 168	PE82.00-P-1100GC
		Model 170	PE82.00-P-1100B
		Model 210	PE82.00-P-1100A
		Model 202 up to 05.97 and models 124, 129, 140	Group 82
	Connection and use of test equipment		**AD00.00-P-1000AZ**
	Tools, testing electrical system, radio (RD)		**AD82.60-P-2000-01A**
	Radio connections, testing electrical system, radio (RD)	MB radio in models 129, 168, 170, 202, 208, 210 up to 05/98 and models 140, 163	**AD82.60-P-2000-02A**
		MB APS radio and navigation operating unit in models 129, 140, 210 up to 12/97	AD82.60-P-2000-02B
		MB APS radio and navigation operating unit in models 129, 140, 202, 210 as of 01/98	AD82.60-P-2000-02C
		MB radio code 750a, 753, 756a in models 129, 168, 170, 202, 208, 210 as of 06/98	AD82.60-P-2000-02D
		MB APS radio and navigation operating unit in models 168, 170	**AD82.61-P-2001-02A**
	Adjusting radio and navigation operating unit to loudspeaker system, testing electrical system, radio (RD)	MB APS radio and navigation operating unit in models 129, 140, 210 up to 12/97	AD82.60-P-2000-03A

	Function notes, radio (RD)	Model 129	AD82.60-P-2000-04A

RADIO (RD) DIAGNOSIS, FUNCTION CHECK - AD82.60-P-3000A

MODEL 124, 129, 140, 163, 168, 170, 202, 208, 210 with MB radio

MODEL 129, 140, 168, 170, 202, 208, 210 with MB radio and navigation operating unit, APS

	Radio (RD) diagnosis, advanced information		**AD82.60-P-2000A**
i	• Battery voltage 11-14 V • Fuses okay **Function check**		
Scope of test	**Operation/Requirement**	**Specified value**	**Possible cause/ Remedy**
1 **Radio functions** in accordance with Owner's Manual	Radio: **ON** Set station with good reception (music) or play music cassette or CD. Fader, bass, treble and balance in position 0 (readout in display). Perform all control functions	Radio reception, cassettes/CD operation, loudness, sound and readouts in display must be faultless i Local and atmospheric influences must be taken into account with radio reception. They may cause interference and poor radio reception.	**AD82.60-P-5000A** Models 129, 170,202, 208, 210 as of 06/98 with digital data bus (D2B): ? AD82.60-P-4000A

RADIO (RD) DIAGNOSIS, TROUBLESHOOTING - AD82.60-P-5000A

MODEL 124, 129, 140, 163, 168, 170, 202, 208, 210 with MB radio

MODEL 129, 140, 168, 170, 202, 208, 210 with MB radio and navigation operating unit, APS

	Radio (RD) diagnosis, previous knowledge		**AD82.60-P-2000A**
	Troubleshooting		
Complaint	**Possible cause**	**Note**	**Remedy**
Radio completely inoperative	Voltage supply for radio (A2) or APS radio and		**AD82.60-P-6000-01A**

	navigation operating unit (A2/29)		
No readout in display	Voltage supply for radio (A2) or APS radio and navigation operating unit (A2/29)		**AD82.60-P-6000-01A**
Cassette operation inoperative	Voltage supply for radio (A2) or APS radio and navigation operating unit (A2/29)		**AD82.60-P-6000-01A**
CD operation in radio (A2) inoperative	Voltage supply for radio (A2) with CD compartment		**AD82.60-P-6000-01A**
CD operation, CD changer (A2/6) completely inoperative	Voltage supply for radio (A2) or APS radio and navigation operating unit (A2/29) Voltage supply, CD changer (A2/6)	MB radio and CD changer Models 129, 140, 168, 202, 208, 210 up to 05/98 Models 124, 163 MB APS radio and navigation operating unit and CD changer Models 129, 140,202, 210	**AD82.60-P-6000-01A** **AD82.60-P-6000-01B**
CD operation, CD changer (A2/6) completely inoperative	Voltage supply for radio (A2) or APS radio and navigation operating unit (A2/29) Voltage supply, CD changer (A2/6)	MB radio and CD changer Models 129, 140, 168, 202, 208, 210 as of 06/98 MB APS radio and navigation operating unit and CD changer Model 168	**AD82.60-P-6000-01A** AD82.60-P-6000-01C
Left front loudspeaker inoperative	Radio (A2) or APS radio and navigation operating unit (A2/29), loudspeaker		**AD82.60-P-6000-02A**
Right front loudspeaker inoperative	Radio (A2) or APS radio and navigation operating unit (A2/29), loudspeaker		**AD82.60-P-6000-03A**
Left rear loudspeaker inoperative	Radio (A2) or APS radio and navigation operating unit (A2/29), loudspeaker		**AD82.60-P-6000-04A**
Right rear loudspeaker inoperative	Radio (A2) or APS radio and navigation operating unit (A2/29), loudspeaker		**AD82.60-P-6000-05A**
Radio interference	Radio (A2) or APS radio and navigation operating		**AD82.60-P-6000-06A**

	unit (A2/29), antenna		
Poor radio reception	Radio (A2) or radio and navigation operating unit (APS) (A2/29), antenna, coverage		**AD82.60-P-6000-07A**
Automatic antenna (M11) inoperative	Radio (A2) or radio and navigation operating unit (APS) (A2/29), automatic antenna (M11)	Except (J) (J) only	**AD82.60-P-6000-08A** AD82.60-P-6000-08B
Speed-sensitive loudness control (GAL) inoperative	Radio (A2) or radio and navigation operating unit (APS) (A2/29), vehicle speed signal	Except model 163	AD82.60-P-6000-09A
Radio or radio and navigation operating unit illumination inoperative	Radio (A2) or radio and navigation operating unit (APS) (A2/29)		**AD82.60-P-6000-10A**
Radio mute circuit (Mute) inoperative when using phone	Radio (A2) or radio and navigation operating unit (APS) (A2/29), telephone system		**AD82.60-P-6000-11A**
With auto pilot system (APS): No fader function or loudspeaker sound quality inadequate	Radio and navigation operating unit (APS) (A2/29) not tuned to loudspeaker system	Models 129, 140, 210 up to 31.12.97	AD82.60-P-2000-03A

VOLTAGE SUPPLY, TESTING ELECTRICAL SYSTEM, RADIO (RD) - AD82.60-P-6000-01A

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Radio (A2) or radio and navigation operating unit (APS) (A2/29)** Voltage supply Terminal 30	8 (A.8) – A2 (V) + 4 (A.4)	Remove radio or operating unit and disconnect coupling A Carry out measurement at coupling	11–14 V	• Cables ⇒ 1.1
1.1	Voltage supply Terminal 15	8 (A.8) – A2 (V) + 7 (A.7)	Remove radio or operating unit and disconnect coupling A Carry out measurement at coupling Ignition: **ON**	11–14 V	• Cables • Fuse E in radio or in APS radio and navigation operating unit • Radio or APS radio and navigation operating unit

Fig. 115: Voltage Supply, Testing Electrical System, Radio (RD)

VOLTAGE SUPPLY, TESTING ELECTRICAL SYSTEM, RADIO (RD) - AD82.60-P-6000-01B

MB radio and CD changer, code 819 in models 129, 140, 168, 202, 208, 210 up to 31.05.98 and in models 124, 163 MB APS radio and navigation operating unit and CD changer, code 819 in models 129, 140, 202, 210

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Radio (A2) or radio and navigation operating unit (APS) (A2/29)** Voltage supply, terminal 30 for CD changer **MB radio and CD changer, code 819 in models 129, 140, 168, 202, 208, 210 up to 31.05.98 and in models 124, 163** **MB APS radio and navigation operating unit and CD changer, code 819 in models 129, 140, 202, 210**	C 6 — A2 (V) — C 4	Remove radio or operating unit and disconnect coupling C Carry out measurement at radio or operating unit, chamber C	10–14 V	• Cables • Fuse E in radio or in APS radio and navigation operating unit ⇒1.1
1.1	Voltage supply for CD changer (A2/6) switched	C 6 — A2 (V) — C 5	Remove radio or operating unit and disconnect coupling C Ignition and radio: **ON** Carry out measurement at radio or operating unit, chamber C	10–14 V	• Cables • Fuse E in radio or in APS radio and navigation operating unit • Radio or APS radio and navigation operating unit

Fig. 116: Voltage Supply, Testing Electrical System, Radio (RD)

LEFT FRONT LOUDSPEAKER OUTPUT, TESTING ELECTRICAL SYSTEM RADIO (RD) - AD82.60-P-6000-02A

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Radio (A2) or radio and navigation operating unit (APS) (A2/29)** Left front loudspeaker output	B 6 — A2 (V) — B 5	Remove radio or operating unit and disconnect coupling B Radio: **ON** Carry out measurement at radio or operating unit, chamber B Adjust loudness control to "loud"	>0.2 V~	• Radio or APS radio and navigation operating unit • Values in order: Loudspeaker system or sound system

Fig. 117: Left Front Loudspeaker Output, Testing Electrical System Radio (RD)

RIGHT FRONT LOUDSPEAKER OUTPUT, TESTING ELECTRICAL SYSTEM RADIO (RD) - AD82.60-P-6000-03A

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Radio (A2) or radio and navigation operating unit (APS) (A2/29)** Right front loudspeaker output	B 4 — A2 (V) — B 3	Remove radio or operating unit and disconnect coupling B Radio: **ON** Carry out measurement at radio or operating unit, chamber B Adjust loudness control to "loud"	>0.2 V~	• Radio or APS radio and navigation operating unit • Values in order: Loudspeaker system or sound system

Fig. 118: Right Front Loudspeaker Output, Testing Electrical System Radio (RD)

LEFT REAR LOUDSPEAKER OUTPUT, TESTING ELECTRICAL SYSTEM RADIO (RD) - AD82.60-P-6000-04A

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Radio (A2) orradio and navigation operating unit (APS) (A2/29)** Left rear loudspeaker output	B 8 —(−(V)+ A2)— 7 B	Remove radio or operating unit and disconnect coupling B Radio: **ON** Carry out measurement at radio or operating unit, chamber B Adjust loudness control to "loud"	>0.2 V~	• Radio or APS radio and navigation operating unit • Values in order: Loudspeaker system or sound system

Fig. 119: Left Rear Loudspeaker Output, Testing Electrical System Radio (RD)

RIGHT REAR LOUDSPEAKER OUTPUT, TESTING ELECTRICAL SYSTEM, RADIO (RD) - AD82.60-P-6000-05A

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Radio (A2) orradio and navigation operating unit (APS) (A2/29)** Right rear loudspeaker output	B 2 —(−(V)+ A2)— 1 B	Remove radio or operating unit and disconnect coupling B Radio: **ON** Carry out measurement at radio or operating unit, chamber B Adjust loudness control to "loud"	>0.2 V~	• Radio or APS radio and navigation operating unit • Values in order: Loudspeaker system or sound system

Fig. 120: Right Rear Loudspeaker Output, Testing Electrical System, Radio (RD)

RADIO INTERFERENCE, TESTING ELECTRICAL SYSTEM, RADIO (RD) - AD82.60-P-6000-06A

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Radio (A2) or Radio : navigation operating unit (APS) (A2/29)** Radio interference when engine is not running		Radio: **ON** Set even transmitter frequency without transmitter reception (e.g. 96.0). Ignition: **ON**	No interference	• Ground connections • Cables • Electronic components ==>1.1
1.1	**Radio interference when engine is running**		Radio: **ON** Set even transmitter frequency without transmitter reception (e.g.	No interference	• Ground connections • Cables

			96.0) Engine: **Start**		• Electronic components • Ignition system • Engine timing • Values in order : Antenna systems (AS)

RADIO RECEPTION, TESTING ELECTRICAL SYSTEM, RADIO (RD) - AD82.60-P-6000-07A

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Radio (A2) or Radio : navigation operating unit (APS) (A2/29)** Radio reception		Radio: **ON** Set station with good reception: Carry out road test	Radio reception in order	• Ground connections • Cables • Radio or APS radio and navigation operating unit • Radio transmitter • Broadcasting corporation • Values in order: Antenna systems (AS)

ACTUATION FOR AUTOMATIC ANTENNA, TESTING ELECTRICAL SYSTEM, RADIO (RD) - AD82.60-P-6000-08A

expect (J)

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Radio (A2) or radio and navigation operating unit APS (A2/29)** Actuation of automatic antenna (M11)/antenna systems (AS)/left/right audio power amplifier control module **except** (J)	8 (A.8) – A2 V + 5 (A.5)	Remove radio or operating unit Do not disconnect couplings Carry out test at coupling A Radio: **ON**	9–14 V	• Radio or APS radio and navigation operating unit • Values in order: Antenna systems (AS) and/or sound system

Fig. 121: Actuation For Automatic Antenna, Testing Electrical System, Radio (RD)

RADIO ILLUMINATION, TESTING ELECTRICAL SYSTEM, RADIO (RD) - AD82.60-P-6000-10A

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Radio (A2) or APS radio and navigation operating unit (A2/29)** Radio illumination when side light is switched off	8 (A.8) – A2 V + 7 (A.7)	Remove radio or operating unit Do not disconnect couplings Carry out test at coupling A Ignition: **ON** Radio: **ON**	11 - 14 V **"ON"** button illuminated **"ON"** button and display illuminated	• Cables • Fuse E in radio or in APS radio and navigation operating unit • Radio or APS radio and navigation operating unit ⇒1.1
1.1	Radio illumination when side light is switched on	8 (A.8) – A2 V + 6 (A.6)	Remove radio or operating unit Do not disconnect couplings Carry out test at coupling A Side light: **ON** Radio: **ON**	11 - 14 V Controls illuminated Controls and display illuminated	• Cables • Fuse E in radio or in APS radio and navigation operating unit • Radio or APS radio and navigation operating unit

Fig. 122: Radio Illumination, Testing Electrical System, Radio (RD)

RADIO MUTE CIRCUIT, TESTING ELECTRICAL SYSTEM, RADIO (RD) - AD82.60-P-6000-11A

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Radio (A2) or radio and navigation operating unit (APS) (A2/29)** Radio mute circuit through telephone system (phone)	8 (A.8) —(▬—▬)— 3 (A.3)	Remove radio or operating unit Do not disconnect couplings Carry out test at coupling A Radio: **ON**	Radio switches to mute, **PHONE** appears in display	• Cables • Radio or APS radio and navigation operating unit • Telephone system

RADIO (RD), TESTING ELECTRICAL SYSTEM - AD82.60-P-6000A

MODEL 124, 129, 140, 163, 168, 170, 202, 208, 210 with MB radio

MODEL 129, 140, 168, 170, 202, 208, 210 with MB radio and navigation operating unit

	Radio (RD) diagnosis, advanced information		AD82.60-P-2000A
i	• Carry out test of loudspeaker outputs		

	additionally with one individual loudspeaker. • In the event of reception faults, carry out test additionally with a separate antenna. • Switch off radio for disconnecting and connecting connections and connectors on the radio and loudspeaker system. • Battery voltage 1114 V • Fuses in order		
	Testing		
1	Voltage supply, testing electrical system, radio (RD)	Voltage supply for radio, terminal 30	**AD82.60-P-6000-01A**
2	Voltage supply, testing electrical system, radio (RD)	Voltage supply for CD changer in models 129, 140, 168, 202, 208, 210 up to 05/98 and models 124, 163	**AD82.60-P-6000-01B**
3	Voltage supply, testing electrical system, radio (RD)	Voltage supply for CD changer in models 129, 140, 168, 202, 208, 210 as of 06/98	AD82.60-P-6000-01C
4	Left front loudspeaker output, testing electrical system, radio (RD)		**AD82.60-P-6000-02A**
5	Right front loudspeaker output, testing electrical system, radio (RD)		**AD82.60-P-6000-03A**
6	Left rear loudspeaker output, testing electrical system, radio (RD)		**AD82.60-P-6000-04A**
7	Right rear loudspeaker output, testing electrical system, radio (RD)		**AD82.60-P-6000-05A**
8	Radio interference, testing electrical system, radio (RD)		**AD82.60-P-6000-06A**
9	Radio reception, testing electrical system, radio (RD)		**AD82.60-P-6000-07A**
10	Actuation for automatic antenna, testing electrical	except J	**AD82.60-P-6000-08A**

	system, radio (RD)		
11	Actuation for automatic antenna, testing electrical system, radio (RD)	only (J)	AD82.60-P-6000-08B
12	Speed-sensistive loudness control, testing electrical system, radio (RD)	except model 163	AD82.60-P-6000-09A
13	Radio illumination, testing electrical system, radio (RD)		**AD82.60-P-6000-10A**
14	Radio mute circuit, testing electrical system, radio (RD)		**AD82.60-P-6000-11A**

CONTENTS - AUDIO 30 APS DIAGNOSIS - AD82.61-P-1001AZ

MODEL 163,168,170, 208, 210 with CODE (353) Audio 30 APS

I 9.4 [] 11	Audio 30 APS diagnosis, basic knowledge		**AD82.61-P-2001A**
I 9.4 [] 12	Audio 30 APS diagnosis, function check		**AD82.61-P-3001A**
I 9.4 [] 13	Audio 30 APS diagnosis, DTC memory		**AD82.61-P-4002A**
I 9.4 [] 14	Audio 30 APS diagnosis, troubleshooting		**AD82.61-P-5001A**
I 9.4 [] 21	Audio 30 APS, testing electric system		**AD82.61-P-6001A**

AUDIO 30 APS DIAGNOSIS TOOLS - AD82.61-P-2001-01A

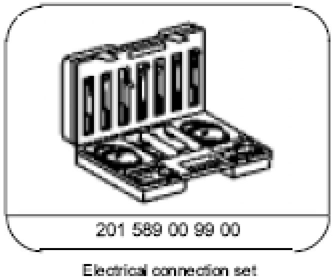


Fig. 123: Identifying Electrical Connection Set (201 589 00 99 00)



Fig. 124: Identifying Adapter Cable (140 589 22 63 00)

Commercially available tools

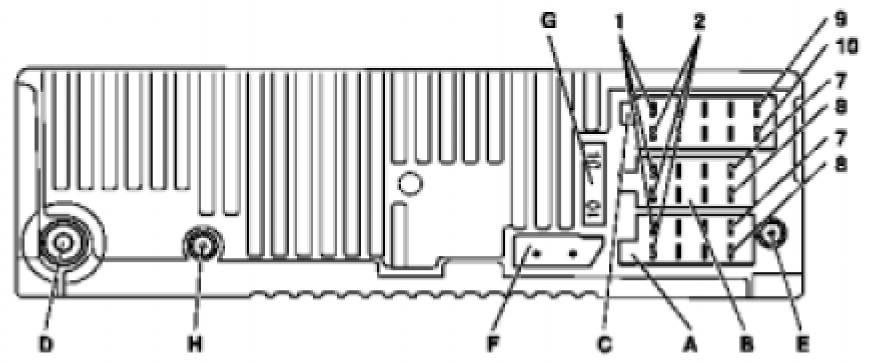
Number	Designation
WH58.30-Z-1001-09A	Multimeter

	Designation		
	MB radio removal tool (000 833 03 61)		

RADIO AND NAVIGATION UNIT CONNECTOR ASSIGNMENTS - AD82.61-P-2001-02A

Connectors on radio and navigation unit (A2/56)

A Connector A
B Connector B
C Connector C
D FM/AM antenna input
E GPS antenna input and direct voltage supply for GPS antenna
F Connector for digital data bus (D2B)
G Fuse
H ZF output (can only be used with FM antenna systems with diversity function)



P82.61-2187-05

Connector A

1 Wheel speed signal
2 Diagnosis (K bus)
3 Mute signal from telephone (optional)
4 C. 30 (continuous positive)
5 Voltage supply for FM/AM antenna amplifier and on/off signal of left/right audio power amplifier (N40/3)
6 C. 58 d (lighting) (not used on models 208, 210, because via CAN)
7 C. 15 (switched positive)
8 C. 31 (ground)

Connector B

1 Right rear loudspeaker +
2 Right rear loudspeaker -
3 Right front loudspeaker +
4 Right front loudspeaker -
5 Left front loudspeaker +
6 Left front loudspeaker -
7 Left rear loudspeaker +
8 Left rear loudspeaker -

Connector C

1 CAN "High" (not used on models 163, 168, 170)
2 CAN "Low" (not used on models 163, 168, 170)
3 Signal for reversing (not used on models 208, 210, because via CAN)
4 Wake-up signal for components of digital data bus (D2B)
5 Terminal 30 for CD changer (A2/6)
6 Terminal 31 for CD changer (A2/6)
7 -
8 -
9 -
10 -

Fig. 125: Identifying Radio And Navigation Unit Connector Assignments

VERSION CODING FOR RADIO AND NAVIGATION UNIT - AD82.61-P-2001-03A

The table below shows the possible **navigation system** adaptations to the vehicle. The settings can be changed with the aid of the handheld tester ("HHT").

Navigation parameters	Possible settings	
ABS pulse count (pulse count from wheel speed sensor per wheel rotation)	Factory setting:	48 (passenger cars)
Tire size	e.g.:	195/50/15
Tire condition [i] Coding is required only when tires are changed. Tire wear occurring while driving is recognized automatically by the navigation system.	New:	Guideline values: Tread depth greater than 5 mm

	Used:	Tread depth less than 5 mm

AUDIO 30 APS DIAGNOSIS, BASIC KNOWLEDGE - AD82.61-P-2001A

MODEL 163,168,170, 208, 210 with CODE (353) Audio 30 APS

(!)	In order to avoid damage to control modules, connectors must only be disconnected or connected with "**terminal 15R:OFF** "		
i	Local or atmospheric influences can cause disruption to radio or satellite reception. Satellite reception is possible only in the open air.		
i	Position finding with assistance of global positioning system data (in degrees of longitude and latitude) takes place within a period of 1 to 20min after "ignition: **ON** ".		
i	The **audio 30 APS** is a **navigation system** with integrated radio and **CD player and** . It also provides an interface for external audio components via a digital data bus (D2B). Existing DMNL deals mainly with navigation system. Diagnosis of the following systems: **radio, D2B, loudspeaker system (LS), CD changer and sound system** can be extracted from the appropriate DMNL.		
GF	Audio 30 APS operating		**GF82.61-P-0002-03A**

	notes		
GF	Audio 30 APS location of components	Model 163	**GF82.61-P-0002-01D**
		Model 168	GF82.61-P-0002-01B
		Model 170	GF82.61-P-0002-01A
		Models 208, 210	GF82.61-P-0002-01C
GF	Location and assignment of cable and plug connections	Model 163	GF00.19-P-1000E
		Model 168	GF00.19-P-1000GC
		Model 170	GF00.19-P-1000B
		Model 208	GF00.19-P-1000D
		Model 210	GF00.19-P-1000A
PE	Overview of electrical wiring diagrams	Model 163	PE82.00-P-1100E
		Model 168	PE82.00-P-1100GC
		Model 170	PE82.00-P-1100B
		Model 208	PE82.00-P-1100D
		Model 210	PE82.00-P-1100A
	Connection and use of test equipment		**AD00.00-P-1000AZ**
	Diagnostic tools, Audio 30 APS		**AD82.61-P-2001-01A**
	Variant coding, radio and navigation unit		**AD82.61-P-2001-03A**
	Connector assignment, radio and navigation unit		**AD82.61-P-2001-02A**

AUDIO 30 APS DIAGNOSIS, FUNCTION CHECK - AD82.61-P-3001A

MODEL 163,168,170, 208, 210 with CODE (353) Audio 30 APS

	Audio 30 APS diagnosis, basic knowledge		**AD82.61-P-2001A**
i	See specified diagnosis manuals for function checks on the following systems: radio (RD), AM/FM antenna systems (ATS) and loudspeaker system (LSA).		
i	Fuses okay		
i	Battery voltage 11-14 V		
	Function check		
Scope of test	**Action/prerequisites**	**Nominal value**	**Possible cause /**

			remedy
1 GPS reception	Vehicle outdoors under free sky Ignition: **ON** Radio and navigation unit (A2/56): **ON** Press "I" button (info). Wait a few minutes if necessary.	The current location is indicated in terms of latitude and longitude, e.g.: LONGIT. 9:01.37E LATIT. 48:42.17N In addition, the number of satellites received is indicated. It is necessary to receive at least 3 satellite signals for two-dimensional GPS location finding. Local or atmospheric influences can cause interruptions in the reception of the GPS signals.	**AD82.61-P-5001A**
2 Navigation	Ignition: **ON** Radio and navigation unit (A2/56): **ON** If necessary: insert navigation CD ROM into **radio and navigation unit (A2/56)** . Press "NAV" button. Check GPS reception (see above) Enter a destination in the vicinity with the aid of the "ADDRESS ENTRY" menu and activate guidance feature by selecting: FASTEST ROUTE or SHORTEST ROUTE or OWN SETTINGS. Drive vehicle along test route	Route calculation may take up to 30 s. Recommendations for guidance or output on the radio loudspeakers (**voice output**) and on the A2/56 display with the aid of route guidance symbols (**pictograms**). Pay particular attention to the time the voice messages are output (the messages should not be output too early or too late). Also observe bar graph display. i If the vehicle is on a "non-digitized" road (company yard, parking lot, country road) the display "OFF ROAD" appears. When driving outside of the digitized map boundaries the display "OFF MAP" appears.	**AD82.61-P-5001A**

AUDIO 30 APS DIAGNOSIS, DTC MEMORY - AD82.61-P-4002A

MODELS 163,168,170, 208, 210 with CODE (353) Audio 30 APS

	Audio 30 APS diagnosis, previous knowledge		**AD82.61-P-2001A**
	Connect hand-held-tester (HHT), read out diagnostic trouble code memory	Model 163 up to 31.8.01, 168	**AD00.00-P-2000-03C**
		Models 170, 208, 210	**AD00.00-P-2000-03A**
i	Communication between the HHT and all other D2B components also takes place via the diagnostic interface of the **radio and navigation unit (A2/56)** . For**DTC's** affecting the **digital data bus (D2B)** , the**CD changer (A2/6)** and the **sound system** , remedy measures are given in the corresponding diagnosis manuals.	See also: Information/Communication Diagnosis Manual Index 13.1 Digital data bus (D2B) See also: Information/Communication Diagnosis Manual Index 6.1 Compact disc player with CD changer	AD82.00-P-1000AZ **AD82.64-P-1000AZ**
i	Fuses okay		
i	Battery voltage 11-14V		
i	The RDS data evaluation is deactivated during HHT diagnosis.		
	Diagnostic trouble code memory		
DTC	**Possible cause**	**Note**	**Remedy**
No fault code	No fault detected	Nevertheless if there is a complaint: ? Audio 30 APS diagnosis, troubleshooting	**AD82.61-P-5001A**
B1000	Internal error in **radio and navigation unit**		A2/56

	(A2/56)		
B1010	**Radio and navigation unit (A2/56)** switches off due to undervoltage		**AD82.61-P-6001-01A**
B1011	**Radio and navigation unit (A2/56)** switches off due to overvoltage		**AD82.61-P-6001-01A**
B1088	**Only on model 208, 210:** Malfunction in CAN connection between **instrument cluster (A1)** and **radio and navigation unit (A2/56)**	[i] The **radio and navigation unit (A2/56)** is connected to the **instrument cluster (A1)** via a separate CAN bus. Read out **instrument cluster (A1)** DTC memory	CAN line between A1 and A2/56
B1734	**Model 163:** Wheel speed signal from CAN bus adapter missing **Model 168:** Signal from **left rear wheel speed sensor (L6/3)** missing **Model 170:** Signal from **left front wheel speed sensor (L6/1)** missing **Models 208, 210:** Signal from **right front wheel speed sensor (L6/2)** missing	[i] The wheel speed signals are passed to the **radio and navigation unit (A2/56)** via a separate line and not directly on CAN. See also: Chassis Diagnosis Manual, index 9 or index 10: ? **Index 10.4 ESP** (Model 163) **Index 10.3 ESP** (Model 168) **Index 10.2 ESP** (Model 208, 210) **Index 10.5 ESP** (Model 208)	**AD82.61-P-6001-03A** **AD42.45-P-1002AZ** AD42.45-P-1002GCZ AD42.45-P-1000AZ See STAR DIAGNOSIS
B1738	**Models 168, 208.4:** **GPS antenna (A2/49a2)** or lead defective **Models 170, 208.3:** **Rear GPS antenna (A2/23a2)** or lead defective		AD82.61-P-6001-05A
	Model 163: **Telephone and GPS roof antenna (A2/49)** or **telephone and**	[i] The GPS and telephone radio signals are transmitted between A2/49 and A2/57 via a common antenna cable.	**AD82.61-P-6001-05B**

	GPS antenna splitter (A2/57) or lead defective		
B1763	Excessive temperature or reading error of CD drive of **radio and navigation unit (A2/56)**		Remove CD-ROM from drive and check for contamination and damage. A2/56
B1765	Gyrosensor defective		A2/56
N1111 N1112 N1113 N1114 N1115 N1116 N1117 N1118	Fiber optic cable defective, Individual D2B units defective or power supply for individual D2B units	See also: ? Information/Communication Diagnosis Manual Index 13.1 Digital data bus (D2B)	Model 168, 170, 208, 210 AD82.00-P-4000A
N1140	**Only on model 208, 210:** DTC in CAN connection between **instrument cluster (A1) and radio and navigation unit (A2/56)**	[i] The **radio and navigation unit (A2/56)** is connected to the **instrument cluster (A1)** via a separate CAN bus. DTC memory for **instrument cluster (A1)**	CAN line between A1 and A2/56
N1141	Nominal-actual configuration of D2B ring varies	See also: ? Information/Communication Diagnosis Manual Index 13.1 Digital data bus (D2B)	Reconfigure system AD82.00-P-4000A
N1250	CD changer Excess temperature		Lower temperature inside vehicle
N1251	CD changer CD reading error		Check CD changer
N1252	CD changer CD magazine error		Check CD magazine
N1253	CD changer Hardware error (mechanical)		Check hardware components and replace if necessary
N1254	CD changer Insufficient temperature		Heating passenger compartment

AUDIO 30 APS DIAGNOSIS, TROUBLESHOOTING - AD82.61-P-5001A

MODEL 163,168,170, 208, 210 with CODE (353) Audio 30 APS

GF	Audio 30 APS operating notes		**GF82.61-P-0002-03A**
GF	Audio 30 APS location of components	Model 163 Model 168 Model 170 Models 208, 210	**GF82.61-P-0002-01D** GF82.61-P-0002-01B GF82.61-P-0002-01A GF82.61-P-0002-01C
	Audio 30 APS diagnosis, previous knowledge		**AD82.61-P-2001A**
i	Battery voltage 11-14V		
	Troubleshooting		
Complaint	**Cause**	**Note**	**Remedy**
Radio and navigation unit (A2/56) completely inoperative	Fuse in A2/56, Voltage supply for A2/56, Defect at navigation CD-ROM, A2/56		**AD82.61-P-6001-01A**
No communication possible between Hand-Held Tester (HHT) and Audio 30 APS	K line, Radio and navigation unit (A2/56)		**AD82.61-P-6001-02A**
Navigation inoperative	Navigation CD-ROM is not loaded or is incorrectly loaded or incorrect / defective CD-ROM Radio and navigation unit (A2/56)		Load navigation CD, refer to: **GF82.61-P-0002-03A**
Destination finding system messages are given too early or too late (e.g. "please turn right")	Check wheel calibration and variant coding		**AD82.61-P-2001-03A**
The **expected arrival time** is not correct	Time on radio and navigation unit (A2/56) is incorrectly set		Actuate "NAV" pushbutton and activate "CLOCK" menu, set time
Navigation is defective or imprecise	Check variant coding and wheel calibration, Reversing signal, Wheel speed signal, Models 163, 168, 208.3, 210: Cellular telephone and GPS roof antenna (A2/49), Models 170, 208.4: GPS rear antenna (A2/23a2)	Models 163, 168, 170 Models 208, 210	Refer to: **AD82.61-P-2001-03A** **AD82.61-P-6001-04A** AD82.61-P-6001-04B **AD82.61-P-6001-03A** AD82.61-P-6001-05A

	Radio and navigation unit (A2/56)		
No reception of **GPS data**	Antenna cable or Model 163: Cellular telephone and GPS roof antenna (A2/49) or cellular telephone and GPS antenna splitter (A2/57) Models 168, 208.3, 210: Cellular telephone and GPS roof antenna (A2/49) Models 170, 208.4: GPS rear antenna (A2/23a2) Radio and navigation unit (A2/56)	i On model 163 only one antenna cable (for telephone and GPS) leads to A2/49. A defective antenna cable would therefore effect a telephone, if connected.	Model 163 **AD82.61-P-6001-05B** Models 168, 170,208,210 AD82.61-P-6001-05A
Radio or loudspeaker functional faults and **poor sound with voice output**	Loudspeaker system or amplifier outputs of radio and navigation unit (A2/56). Only with sound system (code 810): Left/right audio power amplifier (N40/3)	Antenna amplifier test can be carried out using HHT.	Refer to DMNL information / communication Index 3 (RD) Index 5 (LS)
Voice output is fragmentary or inoperative, but audio signal replay (e.g. CD player) functions without complaint.	Voice in RAM of **navigation computer** is partly erased as a result of an interruption in voltage supply. Data fault on navigation CD-ROM Radio and navigation unit (A2/56)	i Avoid excessive shaking while loading voice on A2/56.	Replace CD-ROM
Illumination of radio and navigation unit (A2/56) inoperative (with terminal 58d, ON)	Terminal 58d signal is not on **radio and navigation unit (A2/56)** . i On models 208, 210, terminal 58d is not connected, because A2/56 is connected to A1 via CAN.		**AD82.61-P-6001-06A**

RADIO AND NAVIGATION UNIT, POWER SUPPLY, CHECKING ELECTRICAL SYSTEM, AUDIO 30 APS - AD82.61-P-6001-01A

	Scope of test	Test instrument / test connection	Action / prerequisites	Nominal value	• Possible cause / remedy
1.0 BIDIO BIDII	**Radio and navigation unit (A2/56)** Power supply Circuit 30	8 (A.8) – V – A2/56 4 (A.4)	A2/56 removed Connector A disconnected	11 - 14 V	• **Model 163:** F21 in fuse and relay box (F1) • **Model 168:** f32 in F1 • **Model 170:** f8 in F1 • **Model 208:** f10 in F1 • **Model 210:** f5 in rear fuse box (F4) • Cables Value okay: ⇒1.1
1.1	Power supply Circuit 15R	8 (A.8) – V – A2/56 7 (A.7)	A2/56 removed Connector A disconnected Ignition / starter switch: **Position 1**	11 - 14 V	• **Model 163:** f10 in F1 • **Model 168:** f12 in F1 • **Model 170:** f5 in F1 • **Model 208:** f3 in F1 • **Model 210:** f11 in F1 • Cables

Fig. 126: Radio And Navigation Unit, Power Supply, Checking Electrical System, Audio 30 APS

HHT INTERFACE, TESTING, ELECTRICAL SYSTEM, AUDIO 30 APS - AD82.61-P-6001-02A

	Scope of test	Test instrument / test connection	Action / Prerequisites	Nominal value	• Possible cause / remedy
1.0	**HHT interface** Discontinuity in diagnostic line (K bus) to data link connector (X11 / 4) **Model 163, 168** **Model 170, 210** **Model 208**	X11/4 12 – Ω – A2/56 2 (A.2) X11/4 33 – Ω – A2/56 2 (A.2) X11/4 32 – Ω – A2/56 2 (A.2)	Connector A disconnected from A2/56	< 1 Ω < 1 Ω < 1 Ω	• Wiring

Fig. 127: HHT Interface, Testing, Electrical System, Audio 30 APS

AUDIO 30 APS TEST OF ELECTRICAL SYSTEM WHEEL SPEED SIGNAL - AD82.61-P-6001-03A

&(AD42.45-P-1002BZ)

	Scope of test	Tester/test connection	Operation/ Requirement	Specified value	• Possible cause/ Remedy
1.0 HHT	**Radio and navigation unit (A2/56)** Wheel speed signal from traction system control module (N47) **Models 163, 170:** left front **Model 168:** left rear (LR) **Models 208, 210:** right front		Lift vehicle off the ground (**Model 168:** rear **Models 163, 170, 208, 210:** front) Ignition: **ON** Spin the corresponding wheel by hand, obtaining a readout of the actual navigation value in the pocess. [i] On models 168, 170, 208 and 210 the wheel speed signal arrives at A2/56 directly from N47, on model 163 the signal gets there passing through a separate line from the CAN-bus adapter.	Actual value for the rotational speed is indicated.	• Confirm corresponding actual value reading obtained with HHT in N47, If actual value there matches.: ⇒1.1 See also: DM Chassis, Index 9 or 10 ↓ Ind. 10.4 ESP (Model 163): AD42.45-P-1002AZ Ind. 10.3 ESP (Model 168): AD42.45-P-1002GCZ Ind. 10.2 ESP (Models 208, 210): AD42.45-P-1000AZ Ind. 10.5 ESP (Model 208): See STAR DIAGNOSIS
1.1	Wheel speed signal from traction system control module (N47), measured with oscilloscope **Model 168:** left rear (LR) **Model 163, 170:** left front **Models 208, 210:** right front	8 (A.8) — A2/56 — 1 (A.1)	Remove A2/56 Unplug coupling A Oscilloscop settings: Duration: ca. 50 ms Amplitude: ca. 10 V/div Ignition: **ON** Spin the corresponding wheel by hand	Rectangular wave signal whose frequency changes with the rotational speed of the wheel.	Model 163: • Line from transfer case control module (N78) to CAN-bus adapter • Line from CAN-bus adapter to A2/56 • CAN-bus adapter Models 168, 170, 208, 210: • Line from N47 to A2/56 Value matches nevertheless complaint: • A2/56

Fig. 128: Audio 30 APS Test Of Electrical System Wheel Speed Signal

REVERSE SIGNAL, TESTING, ELECTRICAL SYSTEM, AUDIO 30 APS - AD82.61-P-6001-04A

	Scope of test	Test instrument / test connection	Action / Prerequisites	Nominal value	• Possible cause / remedy
1.0	**Reversing signal Models 163, 168, 170**		Ignition: **ON** Selector lever in position "R" or reverse gear engaged Read out HHT actual value at **radio and navigation unit (A2/56)**	Reverse lamp Status: ON	⇒1.1
1.1	Reverse gear, measure signal voltage	⊥ — A2/56 — 3 (C.3)	Disconnect connector C at **radio and navigation unit (A2/56)** . Ignition: **ON** Selector lever in position "R" or reverse gear engaged. [i] On model 163 with AT the reversing signal travels via a discrete cable from CAN bus adapter to A2/56.	11-14 V	• Cables • **With manual transmission (MT)** ↓ Backup lamp switch (S16/2) • **With automatic transmission (AT)** ↓ **Model 163:** CAN bus adapter **Model 168:** Transmission range recognition module (A61) **Model 170:** Transmission range recognition switch (S16/10)

Fig. 129: Reverse Signal, Testing, Electrical System, Audio 30 APS

AUDIO 30 APS TEST OF ELECTRICAL SYSTEM GPS ANTENNA - AD82.61-P-6001-05B

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0 BI'BB	**Cellular telephone and GPS roof antenna (A2/49) and cellular telephone and GPS antenna splitter (A2/57) Model 163**		Ignition: **ON** Free view of sky is necessary. Read out actual navigation values. [i] GPS antenna signals travel via the **cellular telephone and GPS splitter (A2/57)** to the radio and navigation unit (A2/56). Also check the telephone connected to A2/57 if necessary.	Display of vehicle position in degrees of longitude and latitude and display of "visible" and available satellites.	• Atmospheric interruptions, signal shadows and reflections from buildings can affect GPS reception. ⇒1.1
1.1	Measure voltage supply of cellular telephone and GPS splitter (A2/57) at A2/56	(E) — A2/56 V — Inner conductor (E)	Connector E disconnected at A2/56. Measurement takes place at A2/56. Ignition: **ON** A2/56: **ON** Use adapter cable 140 589 22 63 00 for inner conductor.	approx. 5 V	• A2/56 Value in order: ⇒1.2
1.2	Measure voltage supply of cellular telephone and GPS roof antenna (A2/49) at A2/57	Housing — A2/57 V — Inner conductor	Connector E connected at A2/56. Coaxial connector connected at A2/57 (bush with inscription: GPS). Coaxial connector disconnected at A2/57 (bush with inscription: Antenna). Measurement takes place at center connection of A2/57. Ignition: **ON** A2/56: **ON**	approx. 5 V	• Coaxial cable between A2/56 and A2/57 • A2/57 Value in order: ⇒1.3
1.3	Check coaxial cable and cellular telephone and GPS roof antenna (A2/49) for short-circuit	Shield — A2/57 Ω — Inner conductor	Ignition: **OFF** Disconnect coaxial connector at A2/57 (bush with inscription: Antenna). Measurement takes place at plug of disconnected antenna cable towards A2/49	> 5 Ω	• Coaxial cable from A2/57 to A2/49 • A2/49 Value in order but complaint persists: • Open-circuit in coaxial cable between A2/57 and A2/49 • A2/49

Fig. 130: Audio 30 APS Test Of Electrical System GPS Antenna

RADIO AND NAVIGATION UNIT, ILLUMINATION, TESTING, ELECTRICAL SYSTEM, AUDIO SYSTEM 30 APS - AD82.61-P-6001-06A

	Scope of tests	Test instrument / test connection	Action / Prerequisites	Nominal value	• Possible cause / remedy
1.0	**Radio and navigation unit (A2/56)** Measure voltage supply from terminal 58d **Models 163, 168, 170**	⊥ A2/56 V 6 (A.6)	Disconnect connector A from A2/56. Switch ON parking lamps with rotary light switch (S1). [i] The reading depends on the position of the dimmer. [i] On models 208, 210 terminal 58d is not connected. The appropriate information comes for A1 via CAN.	approx. 9 V	• Wiring Value okay, however, illumination does not function: • A2/56

Fig. 131: Radio And Navigation Unit, Illumination, Testing, Electrical System, Audio System 30 APS

AUDIO 30 APS, TESTING, ELECTRICAL SYSTEM - AD82.61-P-6001A

MODEL 163,168,170, 208, 210 with CODE (353) Audio 30 APS

GF	Audio 30 APS, location of components	Model 163	**GF82.61-P-0002-01D**
GF	Audio 30 APS, location of components	Model 168	GF82.61-P-0002-01B
GF	Audio 30 APS, location of components	Model 170	GF82.61-P-0002-01A
GF	Audio 30 APS, location of components	Model 208, 210	GF82.61-P-0002-01C
GF	Audio 30 APS operating instructions		**GF82.61-P-0002-03A**
GF	Audio 30 APS diagnosis, basic knowledge		**AD82.61-P-2001A**
	Connector assignments on radio and navigation unit		**AD82.61-P-2001-02A**
i	Battery voltage 11 -14 V		
	Testing		
1	Radio and navigation unit power supply, testing, electrical system, Audio 30 APS		**AD82.61-P-6001-01A**
2	HHT interface, testing, electrical system, Audio 30 APS		**AD82.61-P-6001-02A**
3	Wheel speed signal, testing, electrical system, Audio 30 APS		**AD82.61-P-6001-03A**

4	Backup signal, testing, electrical system, Audio 30 APS Model 163, 168, 170		**AD82.61-P-6001-04A**
5	Backup signal, testing, electrical system, Audio 30 APS Model 208, 210		AD82.61-P-6001-04B
6	GPS antenna, testing, electrical system, Audio 30 APS	Model 168, 170, 208, 210	AD82.61-P-6001-05A
7	GPS antenna, testing, electrical system, Audio 30 APS	Model 163	**AD82.61-P-6001-05B**
8	Radio and navigation unit, illumination, testing, electrical system, Audio 30 APS		**AD82.61-P-6001-06A**

ANTENNA SYSTEM (AS) DIAGNOSIS, CONTENTS - AD82.62-P-1000AZ

MODELS 163, 168, 202.078 /080 /083 /182 /188, 208 (except, 208.4), 202.01 /02/12 as of 1.1.97, 210.0 /2

I 4.4 [] 11	Antenna system (AS) diagnosis, previous knowledge		**AD82.62-P-2000A**
I 4.4 [] 12	Antenna system (AS) diagnosis, function check		**AD82.62-P-3000A**
I 4.4 [] 21	Antenna systems (AS), testing electrical system		**AD82.62-P-6000A**

SPEAKER SYSTEM (LSA) DIAGNOSIS CONTENTS - AD82.62-P-1001AZ

MODEL 163 with CODE (491) U.S. version with CODE (259) Radio Premium with Bose sound system

MODEL 163 with CODE (259a) Radio ML 10 with sound system except CODE (491) U.S. version

MODEL 208 with CODE (810) Sound system with MB radio

I 5.13 [] 11	Loudspeaker system (LS) diagnosis, previous knowledge		**AD82.62-P-2001A**
I 5.13 [] 12	Loudspeaker system (LS) diagnosis, function check		**AD82.62-P-3001A**
I 5.13 [] 13a	Loudspeaker system (LS) diagnosis, troubleshooting	Model 208	AD82.62-P-5001A

I 5.13 [] 13b	Loudspeaker system (LS) diagnosis, troubleshooting	Model 163	**AD82.62-P-5001E**
I 5.13 [] 21a	Loudspeaker system (LS) testing electrical system	Model 208	AD82.62-P-6001A
I 5.13 [] 21b	Loudspeaker system (LS) testing electrical system	Model 163	**AD82.62-P-6001E**

LOUDSPEAKER SYSTEM (LS) DIAGNOSIS, CONTENTS - AD82.62-P-1001BZ

MODEL 163 with CODE (491) U.S. version with CODE (257) Radio Hi-Line

MODEL 163 with CODE (257a) Radio ML 5 except CODE (491) U.S. version

MODEL 168,208 with MB radio

I 5.12 [] 11	Loudspeaker system (LS) diagnosis, advanced information		**AD82.62-P-2001B**
I 5.12 [] 12	Loudspeaker system (LS) diagnosis, function check		**AD82.62-P-3001A**
I 5.12 [] 13a	Loudspeaker system (LS) diagnosis, troubleshooting	Model 208	AD82.62-P-5001B
I 5.12 [] 13b	Loudspeaker system (LS) diagnosis, troubleshooting	Model 168	AD82.62-P-5001C
I 5.12 [] 13c	Loudspeaker system (LS) diagnosis, troubleshooting	Model 163	**AD82.62-P-5001D**
I 5.12 [] 21a	Loudspeaker system (LS), testing electrical system	Model 208	AD82.62-P-6001B
I 5.12 [] 21b	Loudspeaker system (LS), testing electrical system	Model 168	AD82.62-P-6001C
I 5.12 [] 21c	Loudspeaker system (LS), testing electrical system	Model 163	**AD82.62-P-6001D**

TOOLS, DIAGNOSIS, ANTENNA SYSTEMS (AS) - AD82.62-P-2000-01A

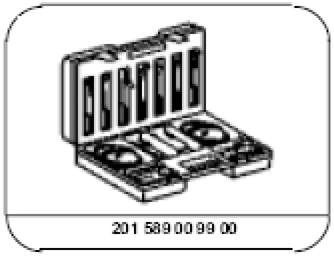


Fig. 132: Identifying Electrical Connection Set (201 589 00 99 00)

Commercially available tools

Number	Designation
WH58.30-Z-1001-09A	Multimeter

ANTENNA SYSTEM (AS) TEST DIAGRAM - AD82.62-P-2000-02D

Model 163

Test diagram for FM/AM radio/amplifier

Model 163:

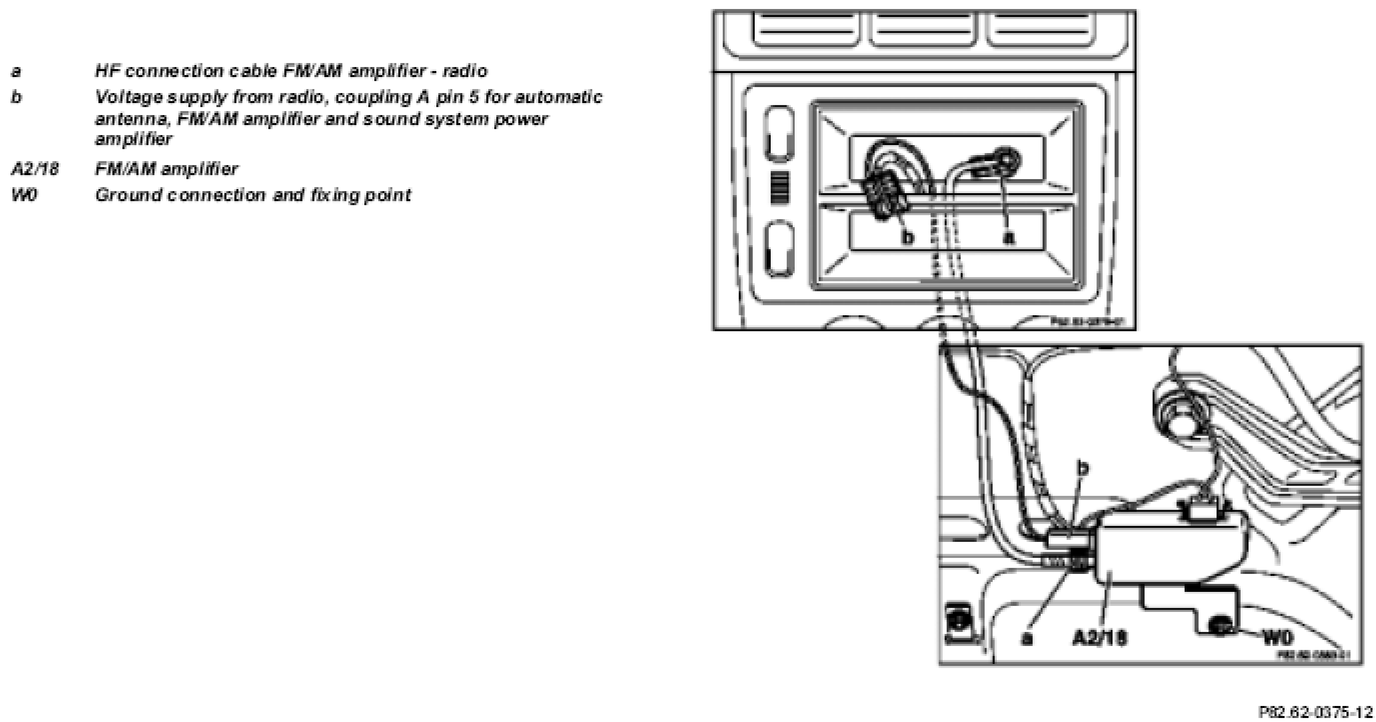


Fig. 133: Antenna System (AS) Test Diagram

ANTENNA SYSTEM (AS) DIAGNOSIS, PREVIOUS KNOWLEDGE - AD82.62-P-2000A

MODELS 163, 168, 202.078 /080 /083 /182 /188, 208 (except, 208.4), 202.01 /02/12 as of 1.1.97, 210.0 /2

GF	Antenna system (AS), location of components	MODEL 208 (except 208.4)	GF82.62-P-0001-03A
		MODELS 202.01/02/12 as of 01.01.97	
		MODELS 202.078/080/083/182/188/210.2	GF82.62-P-0001-03B
		Model 168	GF82.62-P-0001-

			03C
		Model 163	**GF82.62-P-0001-03D**
		Model 210.0	GF82.62-P-0001-03H
PE	Wiring diagrams	MODEL 202 up to 31.05.97, group 82	
		Models 202, 208 from 01.06.97	PE82.00-P-1100D
		Model 168	PE82.00-P-1100GC
		Model 163	PE82.00-P-1100E
		Model 210	PE82.00-P-1100A
	Connecting and using test equipment		**AD00.00-P-1000AZ**
	Tooling diagnosis, antenna system (AS)		**AD82.62-P-2000-01A**
	Checking chart for AS	MODEL 208 except 208.4	AD82.62-P-2000-02A
		MODELS 202.01/02/12 as of 01.01.97	
		MODELS 202.078/080/083/182/188/210.2	AD82.62-P-2000-02B
		Model 168	AD82.62-P-2000-02C
		Model 163	**AD82.62-P-2000-02D**
		Model 210.0	AD82.62-P-2000-02F

DIAGNOSTIC TOOLS, LOUDSPEAKER SYSTEM (LS) - AD82.62-P-2001-01A



Electrical connecting set

Fig. 134: Identifying Electrical Connecting Set (201 589 00 99 00)

Commercially available tools

Number	**Designation**
WH58.30-Z-1001-09A	Multimeter
WH58.30-Z-1006-09A	Function generator

COUPLING ASSIGNMENT ON RADIO FOR LOUDSPEAKER SYSTEM (LS) - AD82.62-P-2001-02A

All MB radios

Coupling B

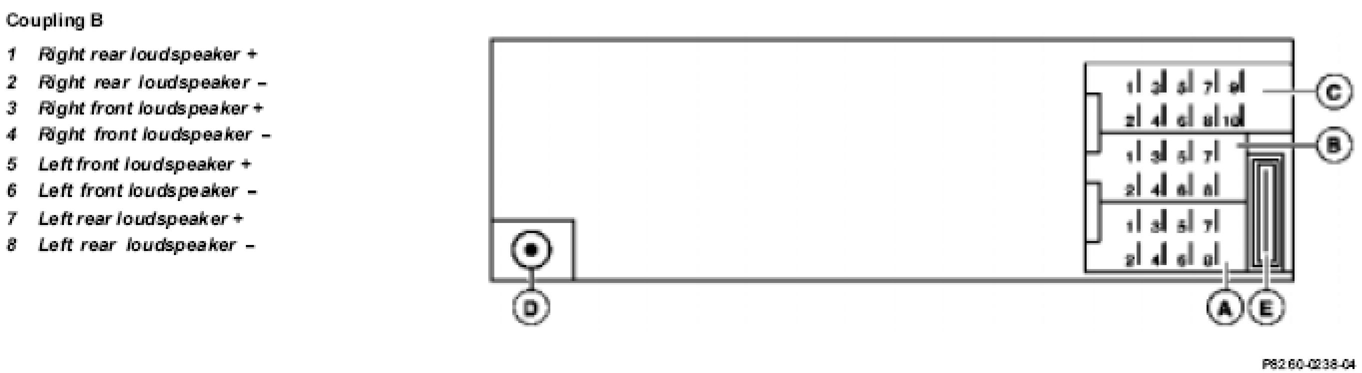


Fig. 135: Identifying Coupling Assignment On Radio For Loudspeaker System (LS)

LOUDSPEAKER SYSTEM (LS) DIAGNOSIS, ADVANCED INFORMATION - AD82.62-P-2001A

MODEL 163 with CODE (491) U.S. version with CODE (259) Radio Premium with Bose sound system

MODEL 163 with CODE (259a) Radio ML 10 with sound system except CODE (491) U.S. version

MODEL 208 with CODE (810) Sound system with MB radio

GF	Loudspeaker system (LS), location of components	Model 208 Model 163	GF82.62-P-0002-01A **GF82.62-P-0002-01E**
PE	Electric wiring diagram, radio with sound system Connection and use of test equipment	Model 208 Model 163	PE82.00-P-1100D PE82.00-P-1100E **AD00.00-P-1000AZ**
	Diagnostic tools, loudspeaker system (LS)		**AD82.62-P-2001-01A**
	Coupling assignment on radio for loudspeaker system (LS)		**AD82.62-P-2001-02A**

LOUDSPEAKER SYSTEM (LS) DIAGNOSIS, ADVANCED INFORMATION - AD82.62-P-2001B

MODEL 163 with CODE (491) U.S. version with CODE (257) Radio Hi-Line

MODEL 163 with CODE (257a) Radio ML 5 except CODE (491) U.S. version

MODEL 168, 208 with MB radio

GF	Loudspeaker system (LS), location of components	Model 208	GF82.62-P-0002-01B
		Model 168 Model 163	GF82.62-P-0002-01C **GF82.62-P-0002-01D**
PE	Electric wiring diagrams	Model 208	PE82.00-P-1100D
		Model 168	PE82.00-P-1100GC
		Model 163	PE82.00-P-1100E
	Connection and use of test equipment		**AD00.00-P-1000AZ**
	Diagnostic tools, loudspeaker system (LS)		**AD82.62-P-2001-01A**
	Coupling assignment on radio for loudspeaker system (LS)		**AD82.62-P-2001-02A**

AM AND FM WAVE BANDS, DIAGNOSIS, FUNCTION CHECK, AS - AD82.62-P-3000-01A

Function check

- Set radio as follows: Set station with poor reception (music) and fader, bass, treble and balance in position 0 (shown in display).
- Check AM and FM wave bands by driving in a circle in a yard (open-air grounds) to establish the reception quality.
- Possibly repeat the test with an identical vehicle for comparison.
- It is absolutely essential to perform the comparison measurement at the **same location** and with the **same station setting** .
- Repeat the test after replacing a component.

ANTENNA SYSTEM (AS) DIAGNOSIS, FUNCTION CHECK - AD82.62-P-3000A

MODELS 163, 168, 202.078 /080 /083 /182 /188, 208 (except, 208.4), 202.01 /02/12 as of 1.1.97, 210.0 /2

	Antenna system (AS) diagnosis, previous knowledge		**AD82.62-P-2000A**
	Operational check		
Test of	**Operation / Requirement**	**Specified value**	**possible cause/ Remedy**

1	AM and FM wavebands diagnosis, AS function check		**AD82.62-P-3000-01A**

LOUDSPEAKER SYSTEM (LS) DIAGNOSIS, FUNCTION CHECK - AD82.62-P-3001A

MODEL all with MB radio

i	• Set station with good reception (music) or play music cassette or CD • Fader, bass, treble and balance in position 0 (shown in display).		
	Function check		
Scope of test	**Operation/Requirement**	**Specified value**	**Possible cause/Remedy**
1 Loudspeaker	Listen to each loudspeaker individually in the respective installed position.		

SPEAKER SYSTEM (LSA) DIAGNOSIS TROUBLESHOOTING - AD82.62-P-5001D

MODEL 163 with CODE (491) U.S. version with CODE (257) Radio Hi-Line

MODEL 163 with CODE (257a) Radio ML 5 except CODE (491) U.S. version

	Loudspeaker system (LS), diagnosis, advanced information		**AD82.62-P-2001B**
	Loudspeaker system (LS), location of components		**GF82.62-P-0002-01D**
	Troubleshooting		
Complaint	**Cause**	**Note**	**Remedy**
Left front door speaker (H4/5) inoperative	Loudspeaker (H4/5) Radio (A2)		**AD82.62-P-6001-02M**
Left rear door speaker (H4/3) inoperative	Loudspeaker (H4/3) Radio (A2)		**AD82.62-P-6001-02O**
Right front door speaker (H4/6) inoperative	Loudspeaker (H4/6) Radio (A2)		**AD82.62-P-6001-02P**
Right rear door speaker (H4/4) inoperative	Loudspeaker (H4/4) Radio (A2)		**AD82.62-P-6001-02R**

SPEAKER SYSTEM (LSA) DIAGNOSIS TROUBLESHOOTING - AD82.62-P-5001E

MODEL 163 with CODE (491) U.S. version with CODE (259) Radio Premium with Bose sound system

MODEL 163 with CODE (259a) Radio ML 10 with sound system except CODE (491) U.S. version

	Loudspeaker system (LS) diagnosis, previous knowledge		**AD82.62-P-2001A**
	LS, location of components		**GF82.62-P-0002-01E**
	Troubleshooting		
Complaint	**Cause**	**Note**	**Remedy**
Loudspeaker system inoperative	Amplifier control module (N40/6) Radio (A2)		**AD82.62-P-6001-01C**
Left rear door speaker (H4/3) inoperative	Left rear door speaker (H4/3) Amplifier control module (N40/6) Radio (A2)		**AD82.62-P-6001-02S** **AD82.62-P-6001-01C**
Right rear door speaker (H4/4) inoperative	Loudspeaker group (H4/4) Amplifier control module (N40/6) Radio (A2)		**AD82.62-P-6001-02T** **AD82.62-P-6001-01C**
Left front door speaker (H4/5) inoperative	Loudspeaker group (H4/5) Amplifier control module (N40/6) Radio (A2)		**AD82.62-P-6001-02U** **AD82.62-P-6001-01C**
Right front door speaker (H4/6) inoperative	Loudspeaker (H4/6) Amplifier control module (N40/6) Radio (A2)		**AD82.62-P-6001-02V** **AD82.62-P-6001-01C**
Acoustimass (R) bass module (H4/17) inoperative	Loudspeaker (H4/17) Amplifier control module (N40/6) Radio (A2)		**AD82.62-P-6001-04A** **AD82.62-P-6001-01C**

RADIO FREQUENCY CONNECTING LINE, ANTENNA SYSTEM (AS) ELECTRICAL SYSTEM TEST - AD82.62-P-6000-02A

	Test of	Gauge/test connection	Operation/ Requirement	Specified value	• Possible cause/ Remedy
1.0	**Radio frequency connecting line FM/AM** amplifier (A2/18) - radio (A2) Continuity Short circuit (screening/ internal cable)		Radio (A2): **OFF** Disconnect cable from radio and FM/AM amplifier, see **MODEL 208 except 208.4, 202.01/02/12:** AD82.62-P-2000-02A **MODELS 202.078/080/083/ 182/ 188, 210.2:** AD82.62-P-2000-02B **Model 168:** AD82.62-P-2000-02C **Model 163:** AD82.62-P-2000-02D **MODEL 210.0:** AD82.62-P-2000-02F	< 10 Ω ∞ Ω	• Cable MODELS 202.078/080/083/182 /188: AD82.62-P-6000-02B

Fig. 136: Radio Frequency Connecting Line, Antenna System (AS) Electrical System Test

VOLTAGE SUPPLY, ANTENNA SYSTEM (AS) ELECTRICAL SYSTEM TEST - AD82.62-P-6000-03A

	Test of	Gauge/test connection	Operation/ Requirement	Specified value	• Possible cause/ Remedy
1.0	**Radio (A2)** Control voltage	W0 A2/18 b	Disconnect coupling from FM/AM amplifier (A2/18), see **MODEL 208 except 208.4** **MODELS 202.01/02/12:** AD82.62-P-2000-02A **MODELS 202.078/080/083/ 182/ 188/210.2:** AD82.62-P-2000-02B **Model 168:** AD82.62-P-2000-02C **Model 163:** AD82.62-P-2000-02D **MODEL 210.0:** AD82.62-P-2000-02F Radio (A2): **ON**	11 - 14 V	• Cable • Radio (A2): AD82.60-P-6000A

Fig. 137: Voltage Supply, Antenna System (AS) Electrical System Test

FM/AM AMPLIFIER POWER CONSUMPTION, ANTENNA SYSTEM (AS) ELECTRICAL SYSTEM TEST - AD82.62-P-6000-04A

	Test of	Gauge/test connection	Operation/ Requirement	Specified value	• Possible cause/ Remedy
1.0	**FM/AM amplifier (A2/18)** Power consumption	A2/18 A2	Connect ammeter between FM/AM amplifier and voltage supply cable from radio (A2), see **MODELS 208, 202.01/02/12:** AD82.62-P-2000-02A **MODELS 202.078/080/083/ 182/ 188/210.2:** AD82.62-P-2000-02B **Model 168:** AD82.62-P-2000-02C **Model 163:** AD82.62-P-2000-02D **MODEL 210.0:** AD82.62-P-2000-02F Radio (A2): **ON**	**MODEL 163** 54-64 mA **MODEL 168:** 20-24 mA **MODEL 202:** 59-69 mA **MODELS 202.078/080/083/182/188:** 60-72 mA **MODEL 208:** 65-75 mA **MODEL 210:** 52-80 mA	• **MODEL 208 except 208.4** FM/AM amplifier ground connection (A2/18) AD82.62-P-6000-05A • **MODEL 208 except 208.4** Value OK but poor reception quality: Replace FM/AM amplifier (A2/18) as a trial and perform function check according to AD82.62-P-3000A .

Fig. 138: FM/AM Amplifier Power Consumption, Antenna System (AS) Electrical System Test

FM/AM AMPLIFIER GROUND CONNECTION, ANTENNA SYSTEM (AS) ELECTRICAL SYSTEM TEST - AD82.62-P-6000-05A

	Test of	Gauge/test connection	Operation/ Requirement	Specified value	• Possible cause/ Remedy
1.0	**Ground connection** FM/AM amplifier (A2/18)	A2/18	Radio (A2): **OFF** [i] Do not release attachment at FM/AM amplifier (A2/18). The attachment point of the amplifier simultaneously serves as the ground connection.	< 1 ohms	• Transition impedance at ground connection

ANTENNA SYSTEMS (AS), TESTING ELECTRICAL SYSTEM - AD82.62-P-6000A

MODELS 163, 168, 202.078 /080 /083 /182 /188, 208 (except, 208.4), 202.01 /02/12 as of 1.1.97, 210.0 /2

	Antenna system (AS) diagnosis, previous knowledge		**AD82.62-P-2000A**
[i]	• Battery voltage 11-14V>		

	• Fuses OK • Radio in order • No damage to the rear window and/or to the rear or side window		
Test step	**Inspecting**		
1	Rear window suppressor capacitor antenna system (AS) electrical system test	except MODELS 163, 210.2	AD82.62-P-6000-01A
2	Radio frequency connecting line, antenna system (AS) electrical system test		**AD82.62-P-6000-02A**
3	Radio frequency connecting line, antenna system (AS) electrical system test	MODELS 202.078/080/083/182/188	AD82.62-P-6000-02B
4	Voltage supply, antenna system (AS) electrical system test		**AD82.62-P-6000-03A**
5	FM/AM amplifier power consumption, antenna system (AS) electrical system test		**AD82.62-P-6000-04A**
6	FM/AM amplifier ground connection, antenna system (AS) electrical system test		**AD82.62-P-6000-05A**

AMPLIFIER CONTROL MODULE TEST ELECTRICS LSA - AD82.62-P-6001-01C

Model 163 with sound system

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Amplifier control module** Radio/loudspeaker (N40/6) Voltage supply **Model 163**	A — N40/6 (V) — H	Disconnect coupling 1 from amplifier control module (N40/6). Radio (A2): **OFF**	11 - 14 V	• Fuse F1/F2 • Ground (right A-pillar) (W29/2) • Cables • Values in order: ⇒1.1
1.1	Control voltage from radio (A2)	A — N40/6 (V) — A1	Disconnect coupling 2 from amplifier control module (N40/6). Radio (A2): **ON**	11 - 14 V	• Cables • Radio (A2) loudspeaker signal AD82.62-P-6001-01D

Fig. 139: Amplifier Control Module Test Electrics LSA

AMPLIFIER CONTROL MODULE TEST ELECTRICS LSA - AD82.62-P-6001-01D

Model 163 with sound system

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Amplifier control module** Radio/loudspeaker (N40/6) Loudspeaker signal from radio (A2) Left front: Right front: Left rear: Right rear: **Model 163**	N40/6 B12 — (V) — B5 B9 — (V) — B6 B10 — (V) — B8 B11 — (V) — B7	Disconnect coupling 2 from amplifier control module (radio/loudspeaker) (N40/6). Radio (A2): **ON** Set loudness control to maximum	>0.2 V ∽ It is permissible for this value not to be reached for a short period	• Cables Radio (A2) AD82.60-P-6000A

Fig. 140: Amplifier Control Module Test Electrics LSA

SPEAKER TEST ELECTRICS LSA - AD82.62-P-6001-02M

Models 163/168

	Scope of test	Measuring equipment/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Loudspeaker** Left front door speaker (H4/5) **Models 163/168**	6 (B.6) — H4/5 (Ω) — 5 (B.5)	Remove radio (A2) and disconnect coupling B. AD82.62-P-2001-02A	3.5-4.5 Ω	• Cables • Loudspeaker (H4/5) • Values in order: Radio (A2) AD82.60-P-6000A

Fig. 141: Speaker Test Electrics LSA

SPEAKER TEST ELECTRICS LSA - AD82.62-P-6001-02O

Models 163, 168, 202, 210

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	Left rear door speaker (H4/3) **Models 163, 168, 202, 210**	8 (B.8) H4/3 Ω 7 (B.7)	Remove radio (A2) and disconnect coupling B. AD82.62-P-2001-02A	3.5–4.5 Ω	• Cables • Loudspeaker (H4/3) • Values in order: Radio (A2) AD82.60-P-6000A

Fig. 142: Speaker Test Electrics LSA

SPEAKER TEST ELECTRICS LSA - AD82.62-P-6001-02P

Models 163 /168

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Loudspeaker** Right front door speaker (H4/6) **Models 163 /168**	4 (B.4) H4/6 Ω 3 (B.3)	Remove radio (A2) and disconnect coupling B. AD82.62-P-2001-02A	3.5-4.5 Ω	• Cables • Loudspeaker (H4/6) • Values in order: Radio (A2) AD82.60-P-6000A

Fig. 143: Speaker Test Electrics LSA

SPEAKER TEST ELECTRICS LSA - AD82.62-P-6001-02R

Models 163, 168, 202, 210

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	Right rear door speaker (H4/4) **Models 163, 168, 202, 210**	2 (B.2) H4/4 Ω 1 (B.1)	Remove radio (A2) and disconnect coupling B. AD82.62-P-2001-02A	3.5–4.5 Ω	• Cables • Loudspeaker (H4/4) • Values in order: Radio (A2) AD82.60-P-6000A

Fig. 144: Speaker Test Electrics LSA

SPEAKER TEST ELECTRICS LSA - AD82.62-P-6001-02S

Model 163 with sound system

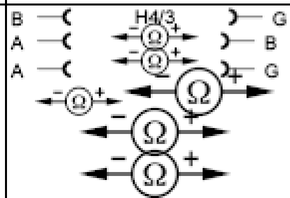
	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Loudspeaker** Left rear door (H4/3) **Model 163**		Radio (A2): **OFF** Disconnect coupling 1 from amplifier control module (N40/6).	1.5-2.5 Ω ∞ Ω ∞ Ω	• Cables • Loudspeaker (H4/3) • Values in order: Amplifier control module (N40/6)

Fig. 145: Speaker Test Electrics LSA

SPEAKER TEST ELECTRICS LSA - AD82.62-P-6001-02T

Model 163 with sound system

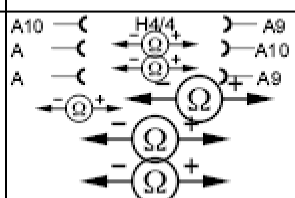
	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Loudspeaker** Right rear door (H4/4) **Model 163**		Radio (A2): **OFF** Disconnect couplings 1 and 2 from amplifier control module (radio/loudspeaker) (N40/6).	1.5-2.5 Ω ∞ Ω ∞ Ω	• Cables • Loudspeaker (H4/4) • Values in order: Amplifier control module (N40/6)

Fig. 146: Speaker Test Electrics LSA

SPEAKER TEST ELECTRICS LSA - AD82.62-P-6001-02U

Model 163 with sound system

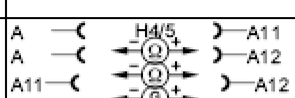
	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Loudspeaker** Left front door (H4/5) **Model 163**		Radio (A2): **OFF** Disconnect couplings 1 and 2 from amplifier control module (N40/6). Connect function generator (a change in voltage level results in a change in loudness; a change in frequency results in a change in sound), set a frequency of 100 to 10,000 Hz with a voltage amplitude of approx. 2 V.	∞ Ω ∞ Ω The frequency adjusted at the function generator can be heard over the loudspeakers	• Cables • Loudspeaker (H4/5) • Values in order: Amplifier control module (N40/6)

Fig. 147: Speaker Test Electrics LSA

SPEAKER TEST ELECTRICS LSA - AD82.62-P-6001-02V

Model 163 with sound system

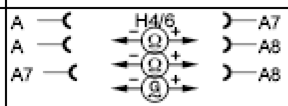
	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Loudspeaker** Right front door (H4/6) **Model 163**		Radio (A2): **OFF** Disconnect couplings 1 and 2 from amplifier control module (N40/6). Connect function generator (a change in voltage level results in a change in loudness; a change in frequency results in a change in sound), set a frequency of 100 to 10,000 Hz with a voltage amplitude of approx. 2 V.	∞ Ω ∞ Ω The frequency adjusted at the function generator can be heard over the loudspeakers	• Cables • Loudspeaker (H4/6) • Values in order: Amplifier control module (N40/6)

Fig. 148: Speaker Test Electrics LSA

LS TEST OF ELECTRICAL SYSTEM BASE SPEAKER - AD82.62-P-6001-04A

Model 163 with sound system

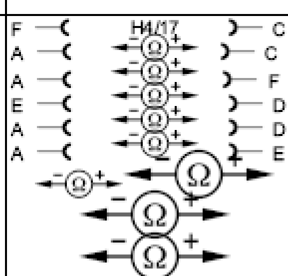
	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Acoustimass (R) bass module** Under left rear seat (H4/17) **Acoustimass (R) bass loudspeaker 1** **Acoustimass (R) bass loudspeaker 2** **Model 163**		Radio (A2): **OFF** Disconnect coupling 1 from amplifier control module (N40/6).	1.5-2.5 Ω ∞ Ω ∞ Ω 1.5-2.5 Ω ∞ Ω ∞ Ω	• Cables • Acoustimass (R) bass module (H4/17) • Values in order: Amplifier control module (N40/6)

Fig. 149: LS Test Of Electrical System Base Speaker

SPEAKER SYSTEM (LSA) TEST ELECTRICS - AD82.62-P-6001D

MODEL 163 with CODE (491) U.S. version with CODE (257) Radio Hi-Line

MODEL 163 with CODE (257a) Radio ML 5 except CODE (491) U.S. version

	Loudspeaker system (LS) diagnosis, advanced information		**AD82.62-P-2001B**

	• Battery voltage 11-14 V • Fuses in order • Radio in order [i] Switch off radio for disconnecting and connecting connections and connectors on the radio and loudspeaker system.		
	Testing		
1	Loudspeaker, testing electrical system, LS	Left front door	**AD82.62-P-6001-02M**
2	Loudspeaker, testing electrical system, LS	Left rear door	**AD82.62-P-6001-02O**
3	Loudspeaker, testing electrical system, LS	Right front door	**AD82.62-P-6001-02P**
4	Loudspeaker, testing electrical system, LS	Right rear door	**AD82.62-P-6001-02R**

SPEAKER SYSTEM (LSA) TEST ELECTRICS - AD82.62-P-6001E

MODEL 163 with CODE (491) U.S. version with CODE (259) Radio Premium with Bose sound system

MODEL 163 with CODE (259a) Radio ML 10 with sound system except CODE (491) U.S. version

	Loudspeaker system (LS) diagnosis, previous knowledge		**AD82.62-P-2001A**
[i]	• Battery voltage 11-14 V • Fuses in order • Radio in order • Loudspeaker for sound system installed [i] To disconnect and contact connections and connectors on the radio and at the loudspeaker system		

	switch off radio.		
	Testing		
1	Amplifier control module, testing electrical system of LS	Spannungsversorgung	**AD82.62-P-6001-01C**
2	Amplifier control module, testing electrical system of LS	Loud Speaker Signal	**AD82.62-P-6001-01D**
3	Loudspeaker, testing electrical system of LS	Left rear Door	**AD82.62-P-6001-02S**
4	Loudspeaker, testing electrical system of LS	Right rear Door	**AD82.62-P-6001-02T**
5	Loudspeaker, testing electrical system of LS	Left front door	**AD82.62-P-6001-02U**
6	Loudspeaker, testing electrical system of LS	Right Front Door	**AD82.62-P-6001-02V**
7	Acoustimass (R) bass module, testing electrical system of LS	Babbox	**AD82.62-P-6001-04A**

CD PLAYER WITH CHANGER (CDC) DIAGNOSIS, CONTENTS - AD82.64-P-1000AZ

MODEL 124,163,168, 202, 208, 210 with CODE (819) 6-disk CD changer in trunk

MODEL 129 as of 1.6.98 with CODE (819) 6-disk CD changer in trunk

I 6.1 [] 11	CD player with changer (CDC) diagnosis, advanced information		**AD82.64-P-2000A**
I 6.1 [] 12	CD player with changer (CDC) diagnosis, function check		**AD82.64-P-3000A**
I 6.1 [] 13	CD player with changer (CDC) diagnosis, fault memory	Models 129, 202, 208, 210 as of 01.06.98 with CODE (819) 6-disk CD changer in trunk and digital data bus (D2B)	AD82.64-P-4000A
I 6.1 [] 14	CD player with changer (CDC) diagnosis, troubleshooting		**AD82.64-P-5000A**
I 6.1 [] 21	CD player with changer (CDC), testing electrical system		**AD82.64-P-6000A**

TOOLS, TESTING ELECTRICAL SYSTEM, CD PLAYER WITH CHANGER - AD82.64-P-2000-01A

Special tools

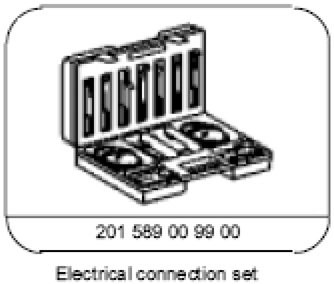


Fig. 150: Identifying Electrical Connection Set (201 589 00 99 00)

Commercially available tools

Number	Designation
WH58.30-Z-1001-09A	Multimeter

CD PLAYER WITH CHANGER CONNECTIONS - AD82.64-P-2000-02B

Model 163

Model 163:

Coupling assignment



Fig. 151: Identifying CD Player With Changer Connections

CD PLAYER WITH CHANGER (CDC), DIAGNOSIS, PREVIOUS KNOWLEDGE - AD82.64-P-2000A

MODELS 124,163,168, 202, 208, 210 with CODE (819) 6-disc CD changer

MODELS 129 as of 1.6.98 with CODE (819) 6-disc CD changer

GF	CD player with changer, location	Models 124, 129, 168, 202, 208, 210	GF82.64-P-3113-01D
	CD player with changer,	Model 163	**GF82.64-P-3113-01GI**

	location		
PE	Wiring diagrams	Models 202, 208 as of 06/97	PE82.00-P-1100D
		Model 210	PE82.00-P-1100A
		Model 163	PE82.00-P-1100E
		Model 168	PE82.00-P-1100GC
		Models 124, 129 and Model 202 up to 05/97, Group 82	
	Connecting and using test equipment		**AD00.00-P-1000AZ**
	Tools for checking the electrical system, CD player with changer		**AD82.64-P-2000-01A**
	CD player with changer, connections	Models 202, 208, 210 up to 05/98 and Models 124, 168	AD82.64-P-2000-02A
		Model 163	**AD82.64-P-2000-02B**
		Models 129, 202, 208, 210 as of 06/98	AD82.64-P-2000-02C

CD PLAYER WITH CHANGER (CDC) DIAGNOSIS, FUNCTION CHECK - AD82.64-P-3000A

MODEL 124,163,168, 202, 208, 210 with CODE (819) 6-disk CD changer in trunk

MODEL 129 as of 1.6.98 with CODE (819) 6-disk CD changer in trunk

MODEL 638 with CODE (EP5) CD changer

	CD changer (CDC) diagnosis, previous knowledge	Models 124, 129, 163, 168, 202, 208, 210	**AD82.64-P-2000A**
		Model 638: DMNL Vito/V-class, CDC	AD82.64-S-2000A
i	• Battery voltage 11 - 14 V • Fuses okay • Radio in order • CD magazine of changer fitted with satisfactory CDs free from protective film		
	Function check		
Scope of test	**Operation/Requirement**	**Specified value**	**Possible cause/ Remedy**
1	Radio: **ON**	CD operation must be	**AD82.64-P-5000A**

		faultless	
Function of CD changer in accordance with radio operating instructions	Adjust loudness on radio Perform all operating functions of CD changer		Models 129, 202, 208, 210 with digital data bus (D2B): ? AD82.64-P-4000A

CD PLAYER WITH CHANGER (CDC) DIAGNOSIS, TROUBLESHOOTING - AD82.64-P-5000A

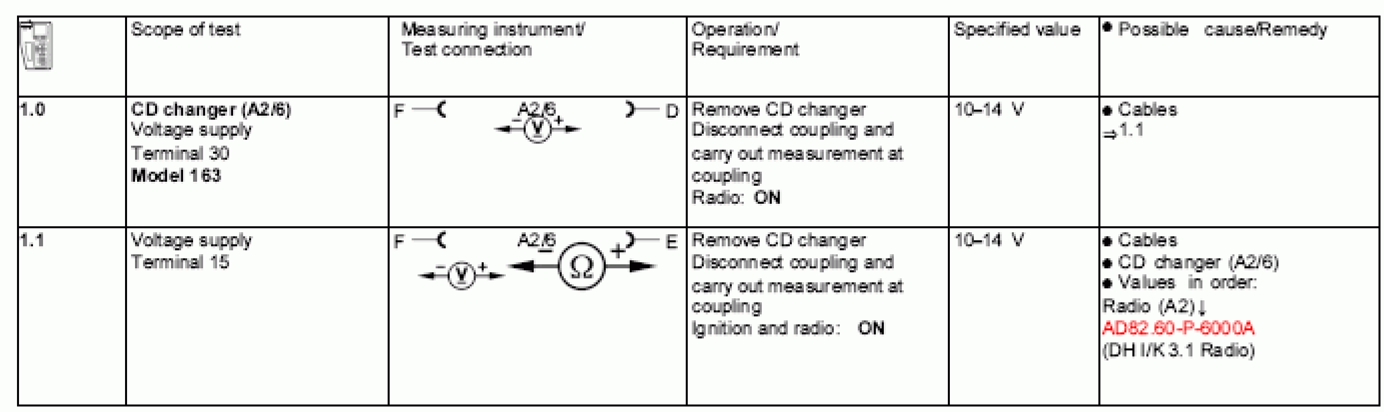
MODEL 124,163,168, 202, 208, 210 with CODE (819) 6-disk CD changer in trunk

MODEL 129 as of 1.6.98 with CODE (819) 6-disk CD changer in trunk

	CD player with changer (CDC) diagnosis, advanced information		**AD82.64-P-2000A**
	Troubleshooting		
Complaint	**Possible cause**	**Note**	**Remedy**
CD player with changer (A2/6) completely inoperative	Voltage supply of CD player with changer (A2/6)	Models 202, 208, 210 up to 05/98 and models 124, 168 Model 163 Models 129, 202, 208, 210 as of 06/98	AD82.64-P-6000-01A &.3.2.(**AD82.64-P-6000-01B**) AD82.64-P-6000-01C
CD player with changer (A2/6), does not load or eject CDs	Single CDs with adapter loaded in CD magazine Adhesive foil on CD has not been removed Voltage supply of CD player with changer (A2/6)	Models 202, 208, 210 up to 05/98 and models 124, 168 Model 163 Models 129, 202, 208, 210 as of 06/98	AD82.64-P-6000-01A &.3.3.(**AD82.64-P-6000-01B**) AD82.64-P-6000-01C
CD player with changer (A2/6) does not respond to controls	CD player with changer (A2/6) Radio (A2)		**AD82.64-P-6000-02A**

VOLTAGE SUPPLY, TESTING ELECTRICAL SYSTEM, CD CHANGER - AD82.64-P-6000-01B

Model 163



	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	CD changer (A2/6) Voltage supply Terminal 30 **Model 163**	F — A2/6 — D	Remove CD changer Disconnect coupling and carry out measurement at coupling Radio: **ON**	10-14 V	• Cables ⇒1.1
1.1	Voltage supply Terminal 15	F — A2/6 — E	Remove CD changer Disconnect coupling and carry out measurement at coupling Ignition and radio: **ON**	10-14 V	• Cables • CD changer (A2/6) • Values in order: Radio (A2)↓ AD82.60-P-6000A (DH I/K 3.1 Radio)

Fig. 152: Voltage Supply, Testing Electrical System, CD Changer

OPERATING FUNCTION, TESTING ELECTRICAL SYSTEM, CD PLAYER WITH CHANGER - AD82.64-P-6000-02A

Model 124, 129, 163, 168, 202, 208, 210

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**CD player with changer (A2/6)** Operating function **Model 124, 129, 163, 168, 202, 208, 210**		Remove CD changer. Disconnect and reconnect coupling. Ignition and radio: **ON**	Operation is possible again	• Cables • CD player with changer (A2/6)

CD PLAYER WITH CHANGER (CDC), TESTING ELECTRICAL SYSTEM - AD82.64-P-6000A

MODEL 124,163,168, 202, 208, 210 with CODE (819) 6-disk CD changer in trunk

MODEL 129 as of 1.6.98 with CODE (819) 6-disk CD changer in trunk

	CD changer (CDC) diagnosis, advanced information		**AD82.64-P-2000A**
i	• Switch off radio for disconnecting and connecting connectors on the radio and CD changer.		

	• Battery voltage 1114 V • Fuses in order • Radio in order		
	Testing		
1	Voltage supply, testing electrical system, CD changer	Models 202, 208, 210 up to 05/98 and models 124, 168	AD82.64-P-6000-01A
2	Voltage supply, testing electrical system, CD changer	Models 163	**AD82.64-P-6000-01B**
3	Voltage supply, testing electrical system, CD changer	Models 129, 202, 208, 210 as of 6/98	AD82.64-P-6000-01C
4	Operating function, testing electrical system, CD changer		**AD82.64-P-6000-02A**

TESTING & REPAIR

TESTING AND REPAIR WORK: PASSENGER CARS: ELECTRICAL SYSTEM BODY - AR82.00-Z-9163AA

MODEL 163

	Removing and installing bulbs of headlamp unit	MODEL 163.113/136 /154 /172 /174 up to 31.8.01	**AR82.10-P-1201GH**
	Remove/install fog lamp bulb	MODEL 163.113/128 /136 /154 /157 /172 /175 with CODE (U49) Styling package MODEL 163.174	**AR82.10-P-1825GH**
	Remove/install fog lamp bulb	MODEL 163...	**AR82.10-P-1825GI**
	Remove/install headlight beam adjustment control module	MODELS 163.154 /172 /113 with CODE (612b) Xenon headlamp unit MODELS 163.174 /175 /128/157	**AR82.10-P-4081GH**
	Remove/install electric headlamp range adjustment motor	MODEL 163.154 /172 /113 with CODE (612) Xenon headlamp unit MODEL 163.174 /175 /128/157	**AR82.10-P-4082GH**
	Remove/install xenon headlamp control unit	MODEL 163...	**AR82.10-P-4632GH**
	Remove/install xenon headlamp control unit	MODEL 163.113 #X as of 754620, 163.113 /154 /174 #A as of 289565, 163.128 /157 /175	**AR82.10-P-4632GI**
	Remove/install turn signal lamps	MODEL 163...	**AR82.10-P-4725GH**

	Remove/install headlamp unit	MODEL 163.113/128 /136 /154 /157 /172 /174 /175	**AR82.10-P-4730GH**
	Remove/install side wall taillamp	MODEL 163	**AR82.10-P-4920GH**
	Remove/install fog lamp	MODEL 163.113/128 /136 /154 /157 /172 /175 with CODE (U49) Styling package MODEL 163.174	**AR82.10-P-5103GH**
	Remove/install fog lamp	MODELS 163.113/154 #A as of 289565, 163.113 /154 #X as of 754620, 163.128 /157 /175	**AR82.10-P-5103GI**
	Removing and installing license plate lamps	MODEL 163	**AR82.10-P-5161GH**
	Removing and installing center high-mounted stop lamp	MODEL 163	**AR82.10-P-5375GH**
	Remove/install telescoping nozzle for headlamp cleaning system	MODELS 163.113/128 /154 /157 /172 /175 with CODE (600a) Headlamp cleaning system MODEL 163.174	**AR82.15-P-6100GH**
	Removing and installing front dome lamp	MODEL 163	**AR82.20-P-0110GH**
	Remove/install rear dome lamp	MODEL 163.113/128 /136 /154 /157 /172 /174 /175	**AR82.20-P-0113GH**
	Remove/install front overhead control panel	MODEL 163.113/128 /136 /154 /157 /172 /174 /175	**AR82.20-P-1100GH**
	Removing and installing wiper arm	MODEL 163.113/128 /136 /154 /157 /172 /174 /175	**AR82.30-P-6100GH**
	Remove/install wiper system	MODEL 163.113/128 /136 /154 /157 /172 /174 /175	**AR82.30-P-6400GH**
	Removing and installing wiper motor	MODEL 163	**AR82.30-P-6800GH**
	Removing and installing rear window wiper motor	MODEL 163	**AR82.30-P-6900GH**
	Removing and installing tailgate wiper arm	MODEL 163	**AR82.30-P-6910GH**
	Remove/install	MODELS 163.113/128 /154 /157 /172 /174 /175	**AR82.30-P-**

	rain sensor	with CODE (345a) Rain sensor	**7700GH**
	Removing and installing washer fluid reservoir of windshield washer system	MODEL 163.113/128 /136 /154 /157 /172 /174 /175 with 7.6 L reservoir	**AR82.35-P-6000GH**
	Remove/install radio	MODEL 129, 163, 168, 170, 202, 208, 210, 414,463...	**AR82.60-P-7502EA**
	Removing and installing CAN bus adapter	MODEL 163 with CODE (353) Audio 30 APS	**AR82.61-P-7413G**
	Remove/install antenna for global positioning system (GPS) on vehicles with APS	MODEL 163...	**AR82.61-P-7474GI**
	Check microphone for sound amplifier	MODELS 163.113/154 /174 #A as of 289565, 163.128 /157 /175 with CODE (810) Sound system	**AR82.62-P-1110GH**
	Removing and installing microphone	MODEL 163...	**AR82.62-P-7700GH**
	Remove/install loudspeaker amplifier control module	MODELS 163.113/128 /136 /154 /157 /172 /175 with CODE (810) Sound system MODEL 163.174	**AR82.62-P-7720GH**
	Remove/install speaker in the side paneling (rear)	MODEL 163...	**AR82.62-P-7837GH**
	Remove/install woofer	MODELS 163.113/128 /136 /154 /157 /172 /175 with CODE (810) Sound system MODEL 163.174	**AR82.62-P-7839GH**
	Removing and installing loudspeakers in front doors	MODEL 163	**AR82.62-P-7845GH**
	Remove/install front door speakers in mirror triangle	MODEL 163...	**AR82.62-P-7850GH**
	Removing and installing loudspeakers in	MODEL 163	**AR82.62-P-7874GH**

	rear doors		
	Remove, install AM/FM amplifier	MODEL 163	**AR82.62-P-8347GH**
	Replace fiber optical cable (D2B) between radio and sound amplifier (after testing)	MODEL 163...	**AR82.62-P-8350GH**
	Remove/install CD player with changer	MODEL 163 with CODE (819) 6-disc CD changer	**AR82.64-P-7507GH**
	Fiber optical cable (D2B) replace complete (after testing)	MODEL 163...	**AR82.70-P-0005GH**
	Fiber optical cable (D2B) replace complete (after testing)	MODEL 163...	**AR82.70-P-0005GI**
	Fiber optical cable (D2B) replace complete (after testing)	MODEL 163...	**AR82.70-P-0005GJ**
	Remove/install antenna splitter	MODEL 163.113/136 /154 /157 /172 /174	**AR82.70-P-8953GH**
	Remove/install electronic compass	MODEL 163...	**AR82.85-P-7371GH**
	Remove/install control module for E-Call emergency call system	MODEL 163...	**AR82.95-P-0008GH**
	Replace fiber optical cable (D2B) between the radio and E-call control module/CTEL [TEL] interface (after testing)	MODEL 163...	**AR82.95-P-0015GH**

REMOVING AND INSTALLING BULBS OF HEADLAMP UNIT - AR82.10-P-1201GH

MODEL 163.113 /136 /154 /172 /174 up to 31.8.01

1	Cover
2	Cover
3	Catch lever
4	Electrical connector
5	Retaining clip
E1e1	High beam bulb
E1e2	Low beam bulb
E1e4	Fog lamp bulb
E1	Left headlamp unit
E2	Right headlamp unit

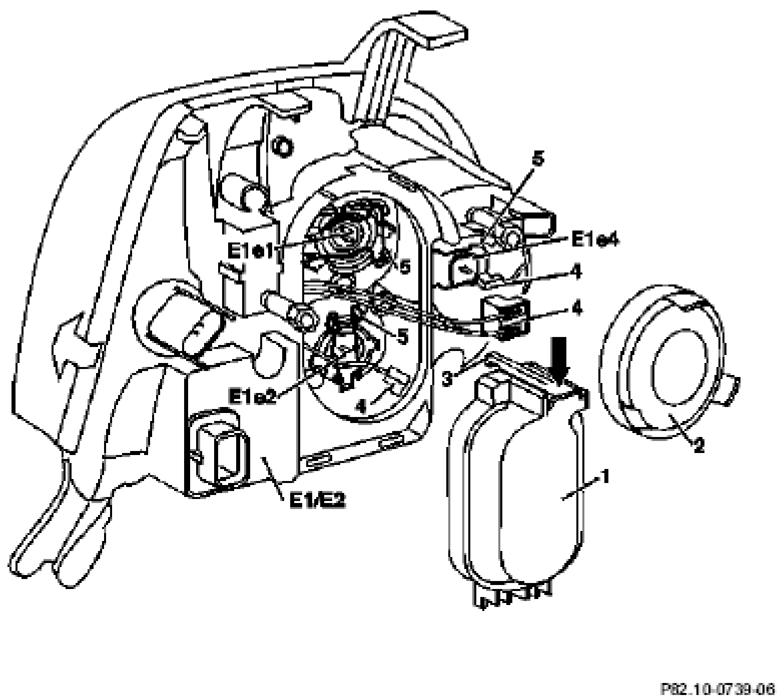


Fig. 153: Identifying Headlamp Unit Bulbs Components

	Remove/install		
1	Open hood and raise to vertical position	Up to 31.08.99 As of 01.09.99	**AR88.40-P-1000GH** **AR88.40-P-1000GI**
2	Release cover (1) by pressing on catch lever (3, direction of arrow) and remove		
3	Remove cover (2)		
4	Disconnect electrical connectors (4) for bulbs		
5	Open retaining clips (5) for bulbs		
6	Remove bulbs (E1e1, E1e2, E1e4)	Do not touch bulbs with bare fingers, use grease-free, soft cloth. i **Installation:** Ensure bulb is correctly installed.	
7	Install in the reverse order		
8	Perform function check		

REMOVE/INSTALL FOG LAMP BULB - AR82.10-P-1825GH

MODEL 163.113/128/1 /154 /157 /172 /175 with CODE (U49) Styling package

MODEL 163.174

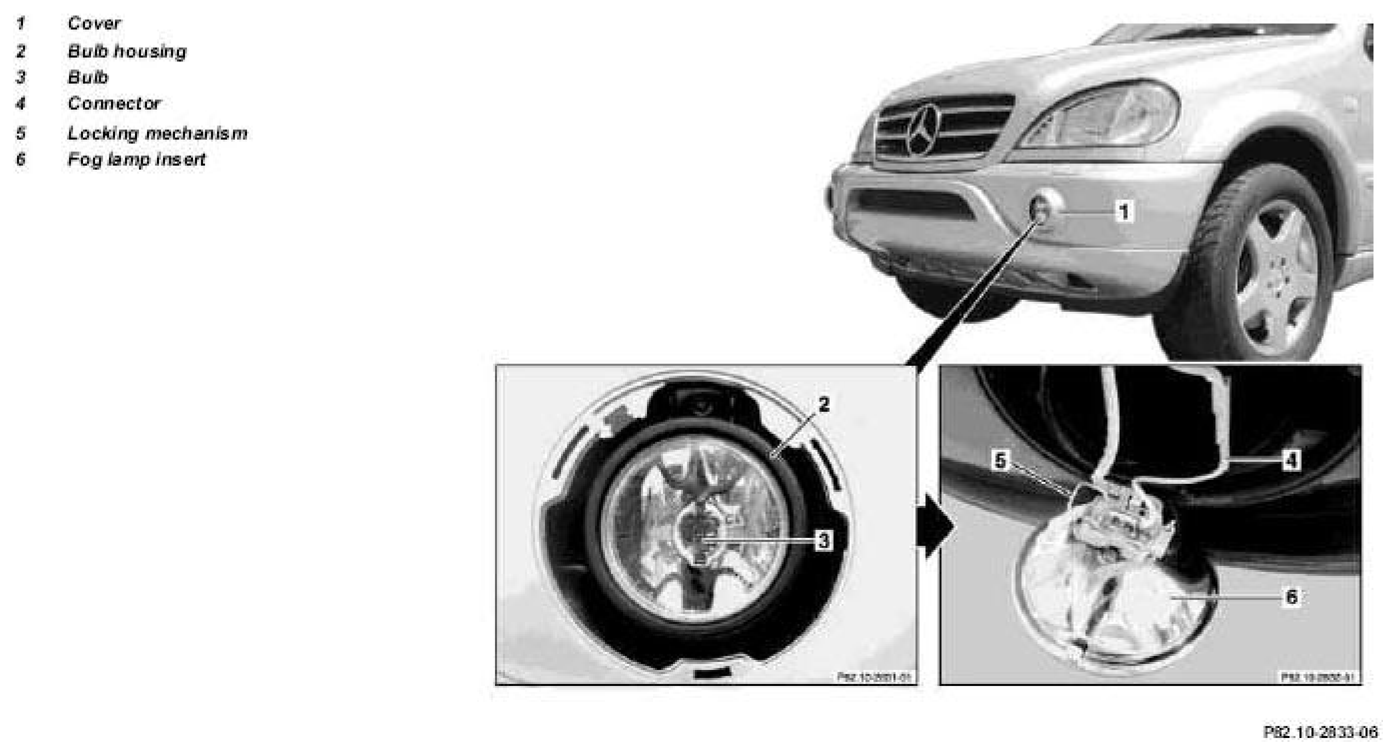


Fig. 154: Identifying Fog Lamp Components

	Remove/install		
1	Remove cover (1) from bumper	i Do not break retaining lugs.	
2	Remove bulb housing (2)	i To unlock, rotate counterclockwise. i **Installation:** Ensure that the locking device has locked securely.	
3	Remove fog lamp insert (6) from housing	Installation wedge	**Fig. 155**
4	Disconnect connector (4)		
5	Remove bulb on the back of the fog lamp insert (6)	Do not hold the bulb with bare fingers, as fingerprints bake and leave behind opaqueness on the bulb. Use a soft, lint-free cloth. i Lock securely.	
6	Install in the reverse		

	order		

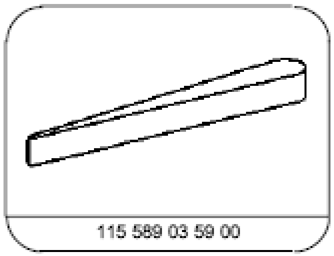


Fig. 155: Identifying Longitudinal Wedge (115 589 03 59 00)

REMOVE/INSTALL FOG LAMP BULB - AR82.10-P-1825GI

MODELS 163.113 #A as of 289565, 163.113 #X as of 754620, 163.154 #A as of 289565, 163.154 #X as of 754620, 163.128/157/175

1 Fog lamps
2 Bulb with plug

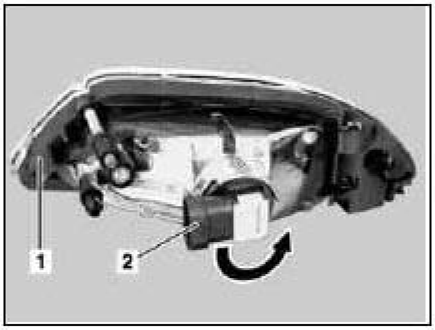


Fig. 156: Identifying Fog Lamp Bulb Components

	Remove/install		
1	Remove fog lamp (1)		**AR82.10-P-5103GI**
2	Remove bulb with plug (2)	Do not hold the bulb with bare fingers, as fingerprints bake and leave behind opaqueness on the bulb. Use a soft, lint-free cloth. i To unlock, rotate counterclockwise. i The bulb and plug are one unit.	
3	Install in the reverse order		

REMOVE/INSTALL HEADLIGHT BEAM ADJUSTMENT CONTROL MODULE - AR82.10-P-4081GH

MODELS 163.154 /172 /113 with CODE (612b) Xenon headlamp unit

MODELS 163.174/175/128/157

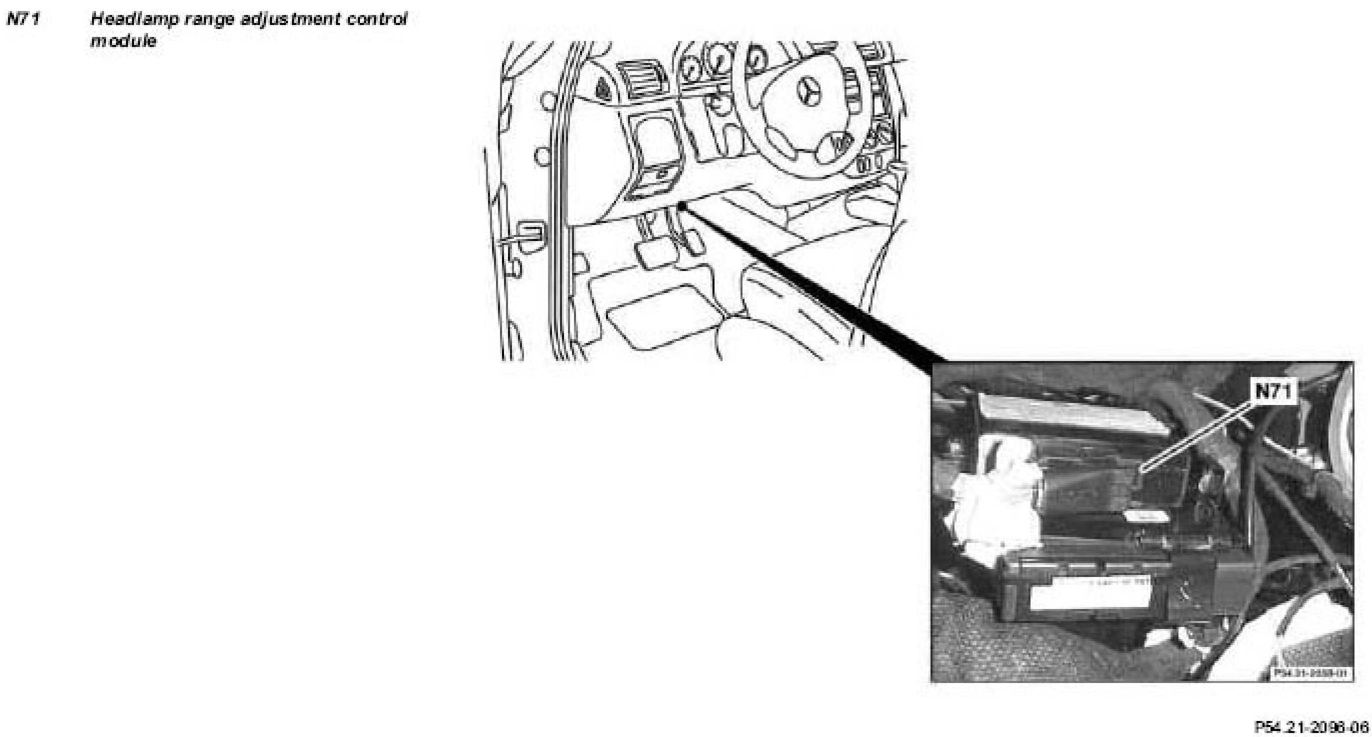


Fig. 157: Identifying Headlight Beam Adjustment Control Module

	Remove/Install		
1	Remove cover below instrument panel (left)		**AR68.10-P-1500GH**
2	Disconnect connector from headlamp range adjustment control module (N71)		
3	Unscrew headlamp range adjustment control module from mount of extended activity module (EAM)	i 2 nuts.	
4	Remove headlamp range adjustment control module (N71)		
5	Install in the reverse order		
6	Adjust headlamp into zero position using STAR DIAGNOSIS		

7	Inspect headlamp adjustment, correct if necessary.		
AP	Check and correct headlamp adjustment		**AP82.10-P-8260GH**

REMOVE/INSTALL ELECTRIC HEADLAMP RANGE ADJUSTMENT MOTOR - AR82.10-P-4082GH

MODEL 163.154 /172 /113 with CODE (612) Xenon headlamp unit

MODEL 163.174/175/128/157

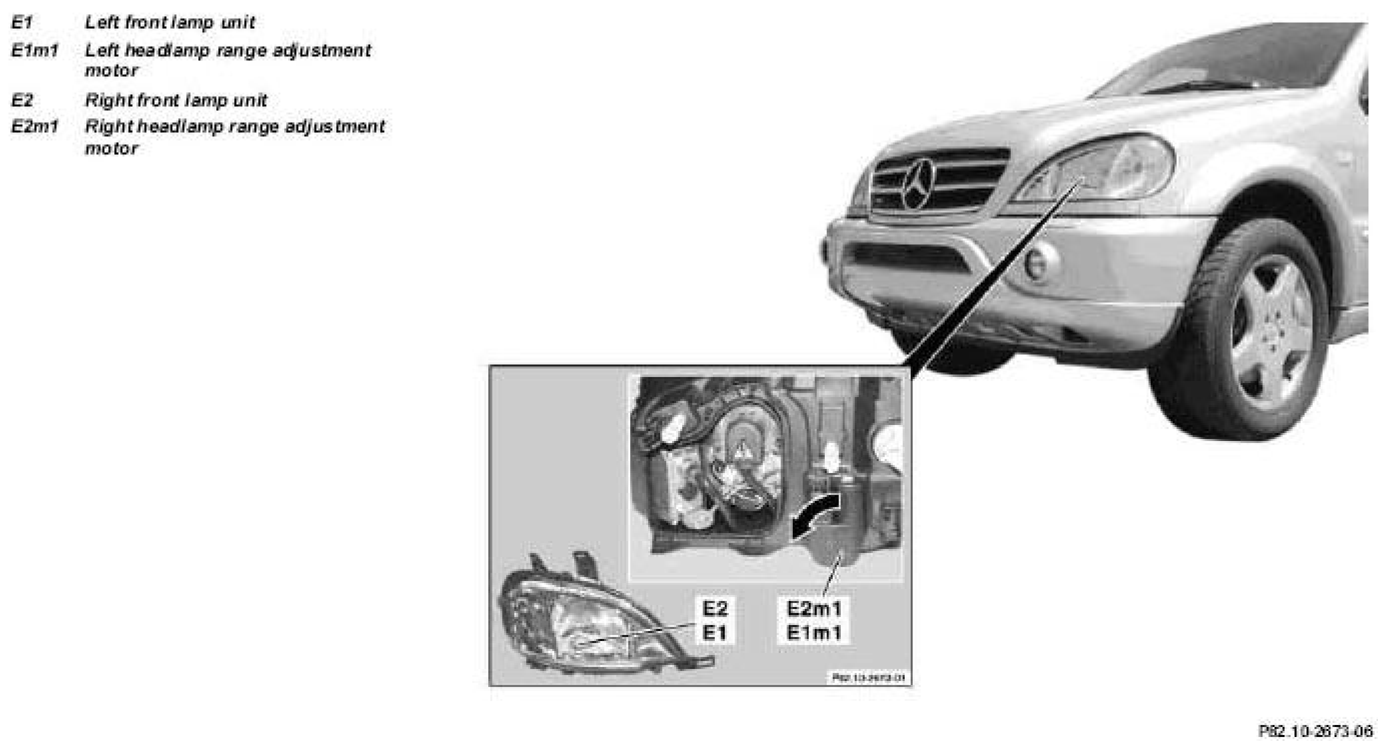


Fig. 158: Identifying Electric Headlamp Range Adjustment Motor Components

	Remove/install		
Danger!	**Risk of death** caused by high voltage levels present at xenon headlamps. **Risk of explosion/fire hazard** through highly flammable material in the area of damaged xenon bulbs **Risk of injury** through	Do not come into contact with parts that are under high voltage. Persons with **active electronic implants** (e.g. heart pacemakers) must never work on xenon headlamps. Switch off complete lighting system. Wear insulating safety shoes, safety glasses and	**AS82.10-Z-0001-01A**

	UV light, hot components on xenon headlamps and glass splinters when xenon bulbs burst **Risk of poisoning** through inhalation of mercury vapor and swallowing of or skin contact with toxic salts and mercury compounds	protective gloves. Remove highly inflammable materials from the hazard area. Ensure that the workplace is sufficiently ventilated.	
1	Remove left front lamp unit (E1) or right front lamp unit (E2)		**AR82.10-P-4730GH**
2	Remove cover from rear of lamp unit		
3	Turn left headlamp range adjustment motor (E1m1) or right headlamp range adjustment motor (E2m1) to right and remove from left front lamp unit (E1) or right front lamp unit (E2)	i Left side: 1/4 clockwise rotation. Right side: 1/4 counterclockwise rotation.	
4	Unhook adjusting support and remove left headlamp range adjustment motor (E1m1) or right headlamp range adjustment (E2m1)		
5	Install in the reverse order		
6	Set headlamps to zero position using STAR DIAGNOSIS		
7 AP	Inspect headlamp adjustment, correct if necessary. Check and correct headlamp adjustment		**AP82.10-P-8260GH**

REMOVE/INSTALL XENON HEADLAMP CONTROL UNIT - AR82.10-P-4632GH

MODEL 163.113 #X up to 754619, 163.113 /154 #A up to 289564, 163.172 with CODE (612) Xenon

headlamp unit

MODEL 163.174 #A up to 289564

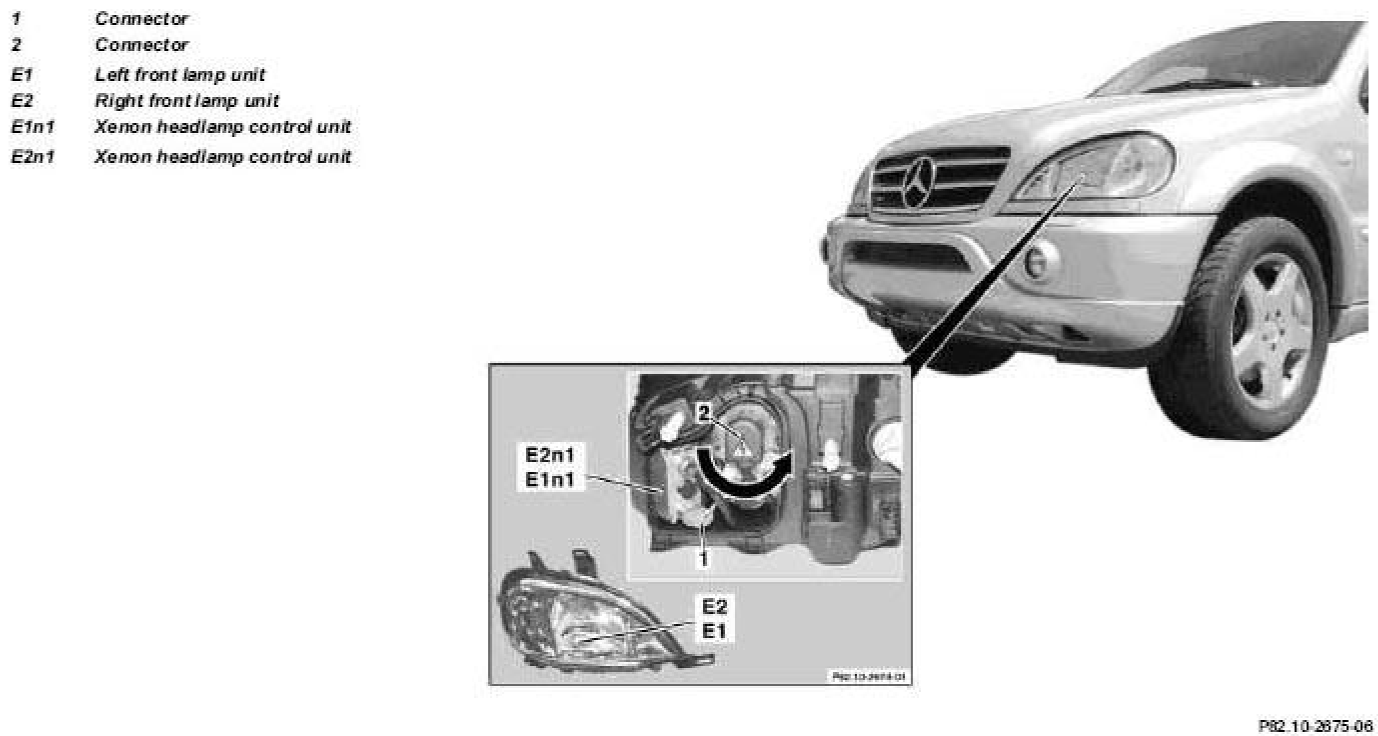


Fig. 159: Identifying Xenon Headlamp Control Unit Components

	Remove/install		
Danger!	**Risk of death** caused by high voltage levels present at xenon headlamps. **Risk of explosion/fire hazard** through highly flammable material in the area of damaged xenon bulbs. **Risk of injury** through UV light, hot components on xenon headlamps and glass splinters when xenon bulbs burst. **Risk of poisoning** through inhalation of mercury vapor and	Do not come into contact with parts that are under high voltage. Persons with **active electronic implants** (e.g. heart pacemakers) must never work on xenon headlamps. Switch off complete lighting system. Wear insulating safety shoes, safety glasses and protective gloves. Remove highly inflammable materials from the hazard area. Ensure that the workplace is sufficiently ventilated.	**AS82.10-Z-0001-01A**

	swallowing of or skin contact with toxic salts and mercury compounds.		
1	Remove left front lamp unit (E1) or right front lamp unit (E2)		**AR82.10-P-4730GH**
2	Remove cover from rear of lamp unit		
3	Detach plug (1, 2) on xenon headlamp control unit(E1n1, E2n1)	i Turn connector 1/4U turn counterclockwise.	
4	Remove xenon headlamp control unit (E1n1, E2n1)	i Carefully press control unit off of mount using long wedge Long wedge	**Fig. 155**
5	Install in the reverse order		
6	Set headlamps to zero position using STAR DIAGNOSIS		
7 AP	Inspect headlamp adjustment, correct if necessary. Check and correct headlamp adjustment		**AP82.10-P-8260GH**

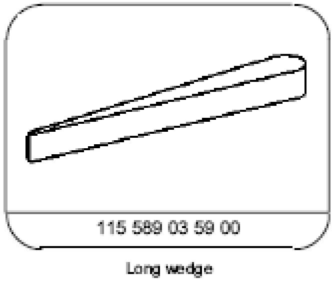


Fig. 160: Identifying Long Wedge (115 589 03 59 00)

REMOVE/INSTALL XENON HEADLAMP CONTROL UNIT - AR82.10-P-4632GI

MODEL 163.113 #X as of 754620, 163.113 /154 /174 #A as of 289565, 163.128/157/175

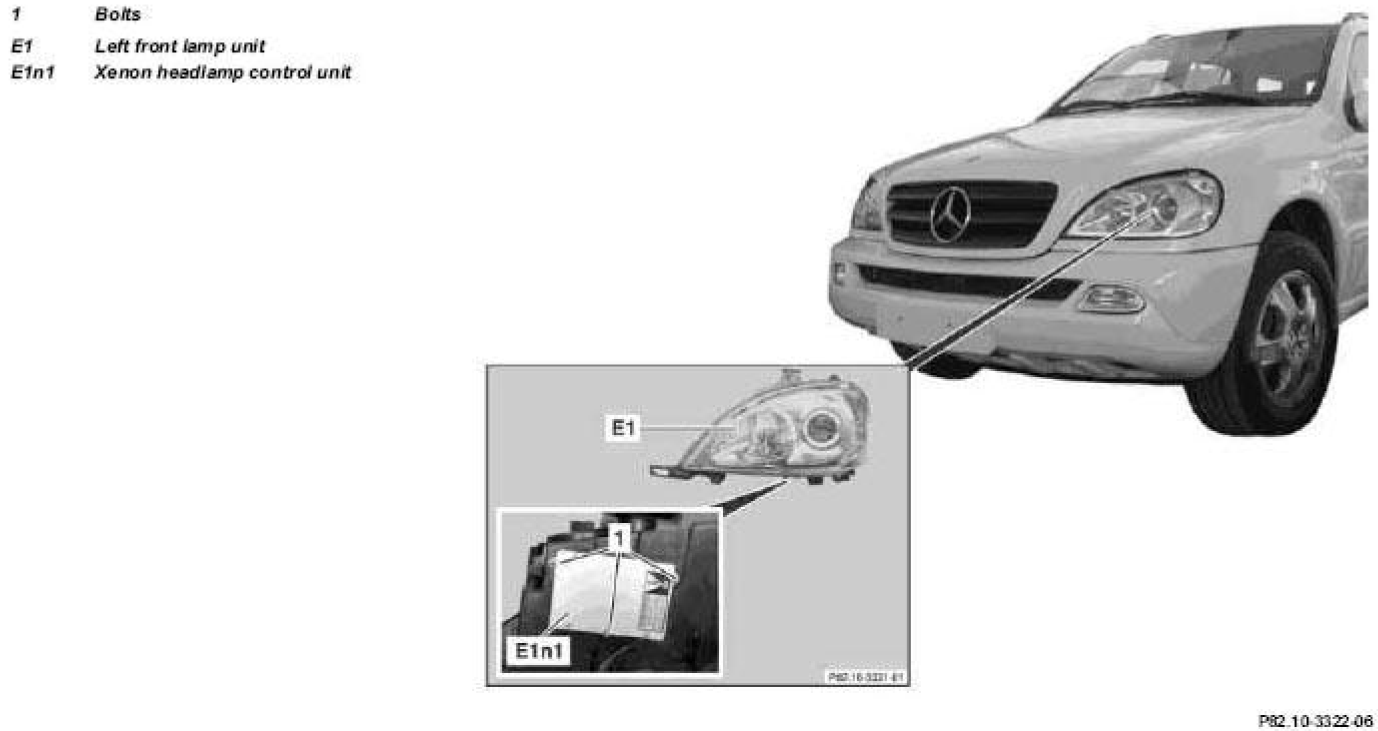


Fig. 161: Identifying Xenon Headlamp Control Unit Components

	Remove/install		
Danger!	**Risk of death** caused by high voltage levels present at xenon headlamps. **Risk of explosion/fire hazard** through highly flammable material in the area of damaged xenon bulbs. **Risk of injury** through UV light, hot components on xenon headlamps and glass splinters when xenon bulbs burst. **Risk of poisoning** through inhalation of mercury vapor and swallowing of or skin contact with toxic salts and mercury compounds.	Do not come into contact with parts that are under high voltage. Persons with **active electronic implants** (e.g. heart pacemakers) must never work on xenon headlamps. Switch off complete lighting system. Wear insulating safety shoes, safety glasses and protective gloves. Remove highly inflammable materials from the hazard area. Ensure that the workplace is sufficiently ventilated.	**AS82.10-Z-0001-01A**
1	Remove left front lamp unit (E1) or right front		**AR82.10-P-4730GH**

	lamp unit		
2	Place headlamp in inverted position on workbench	Place on a soft base so that the headlamp lens is not scratched.	
3	Remove bolts (1)	i 3 each.	
4	Remove Xenon headlamp control unit	i Is unplugged automatically when removed.	
5	Install in the reverse order		
6	Set headlamps to zero position using STAR DIAGNOSIS		
7	Inspect headlamp adjustment, correct if necessary.		
AP	Check and correct headlamp adjustment		AP82.10-P-8260GH

REMOVE/INSTALL TURN SIGNAL LAMPS - AR82.10-P-4725GH

MODELS 163.113 /154 /174 #A as of 289565, 163.113 #X as of 754620, 163.128/157/175

Turn signal lamp in exterior mirror

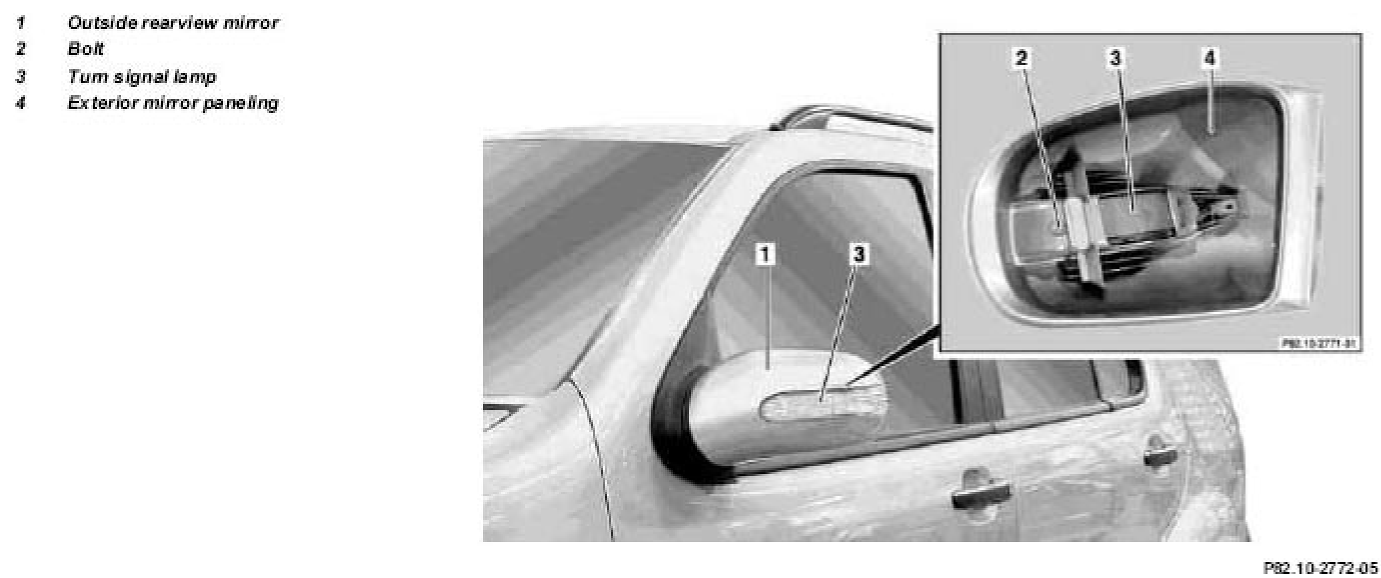


Fig. 162: Identifying Turn Signal Lamp Components

	Remove/install		
1	Remove exterior mirror		AR88.70-P-9040GI

	paneling (4)		
2	Unscrew screw (2) of turn signal lamp (3) in the exterior mirror paneling (4)		
3	Remove turn signal lamp (3) from the exterior mirror paneling (4)		
4	Install in the reverse order		

REMOVE/INSTALL HEADLAMP UNIT - AR82.10-P-4730GH

MODEL 163.113 /128 /136 /154 /157 /172 /174 /175

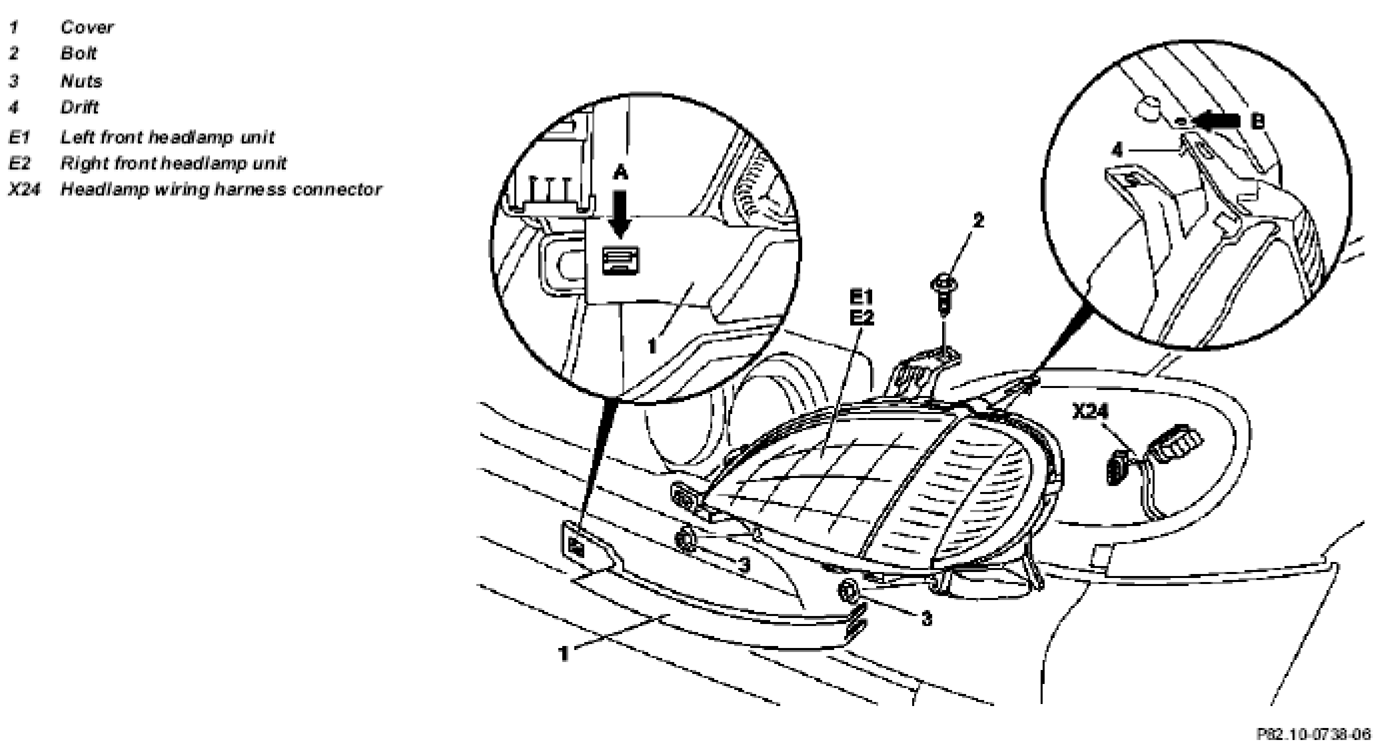


Fig. 163: Identifying Headlamp Unit Components

	Remove/Install		
1	Open engine hood		
2	Unlock cover (1) at the clip (arrow A) under the lamp unit and unhook	i **Installation:** Lock clip again.	
3	Unscrew screw (2)		
4	Unscrew nuts (3).	i **Installation:** Align the lamp unit so that the	

		distance of the cover to the bumper is even.	
5	Unhook left front headlamp unit (E1) or right front headlamp unit (E2) from the hole (arrow B) using drift (4) and pull forwards		
6	Disconnect headlamp harness connector (X24)		
7	Remove headlamp unit toward front		
8	Install in the reverse order		
9	Perform function check		
10	Check and correct headlamp adjustment		
AP	Check and correct headlamp adjustment		**AP82.10-P-8260GH**

INSTALLING AUXILIARY CABLE HARNESS ON SIDE WALL TAILLAMP - AR82.10-P-4920-01GH

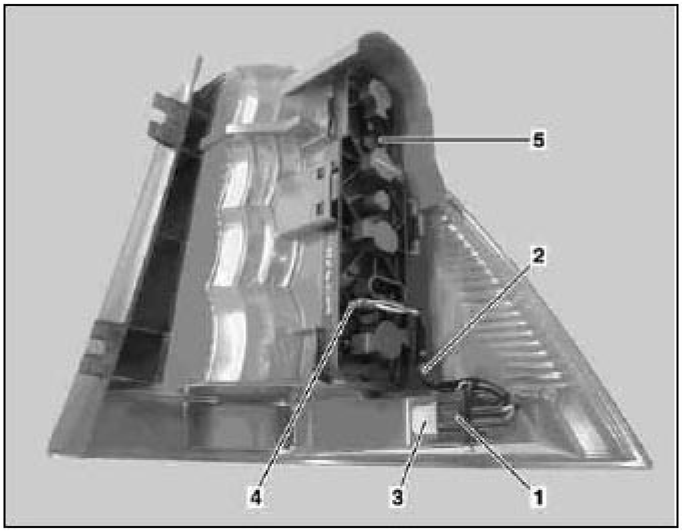
Models 163.154/174 as of VINA289565 to VIN A371934, model 163.175 up to VIN A371934 with USA version code 494a

1. Insert plug (1) of auxiliary cable harness (2) in socket (3) of side-marker lamp.
2. Insert the plug on the other end of the wiring harness in the free connection pins in the opening (4) of the lamp support (5).

   i The brown line (ground) should be on the outside. Ensure that the plugs are completely pushed onto the connection pins.

3. Seal the lines and opening (4) with a thermoplastic adhesive gun.

   i Give the adhesive sufficient time to dry before installing the taillamp.



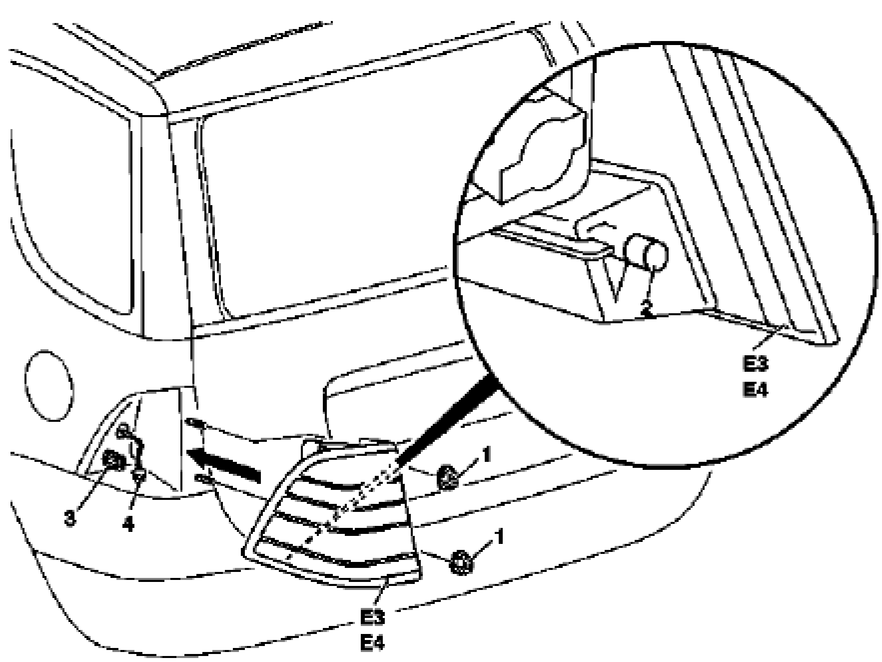
P82.10-3215-11

Fig. 164: Identifying Auxiliary Cable Harness On Side Wall Taillamp

REMOVE/INSTALL SIDE WALL TAILLAMP - AR82.10-P-4920GH

MODEL 163

1 Nuts
2 Spigot
3 Mounting fixture
4 Connector
E3 Left taillamp
E4 Right taillamp



P82.10-0740-06

Fig. 165: Identifying Side Wall Taillamp

	Remove/Install		

1	Open rear flap		
2	Unscrew nuts(1)		
3	Pull back left taillamp (E3) or right taillamp (E4)	i **Installation:** Insert spigot (2) in the support (3).	
4	Unplug connector (4)		
5	Take out taillamp		
6.1	Install auxiliary wiring harness	i Only if the taillamp is replaced. Only on USA version vehicles, code 494a and as of VIN A289565 up to A371934.	**AR82.10-P-4920-01GH**
7	Install in the reverse order		
8	Perform function check		

REMOVE/INSTALL FOG LAMP - AR82.10-P-5103GH

MODEL 163.113 /128 /136 /154 /157 /172 /175 with CODE (U49) Styling package

MODEL 163.174

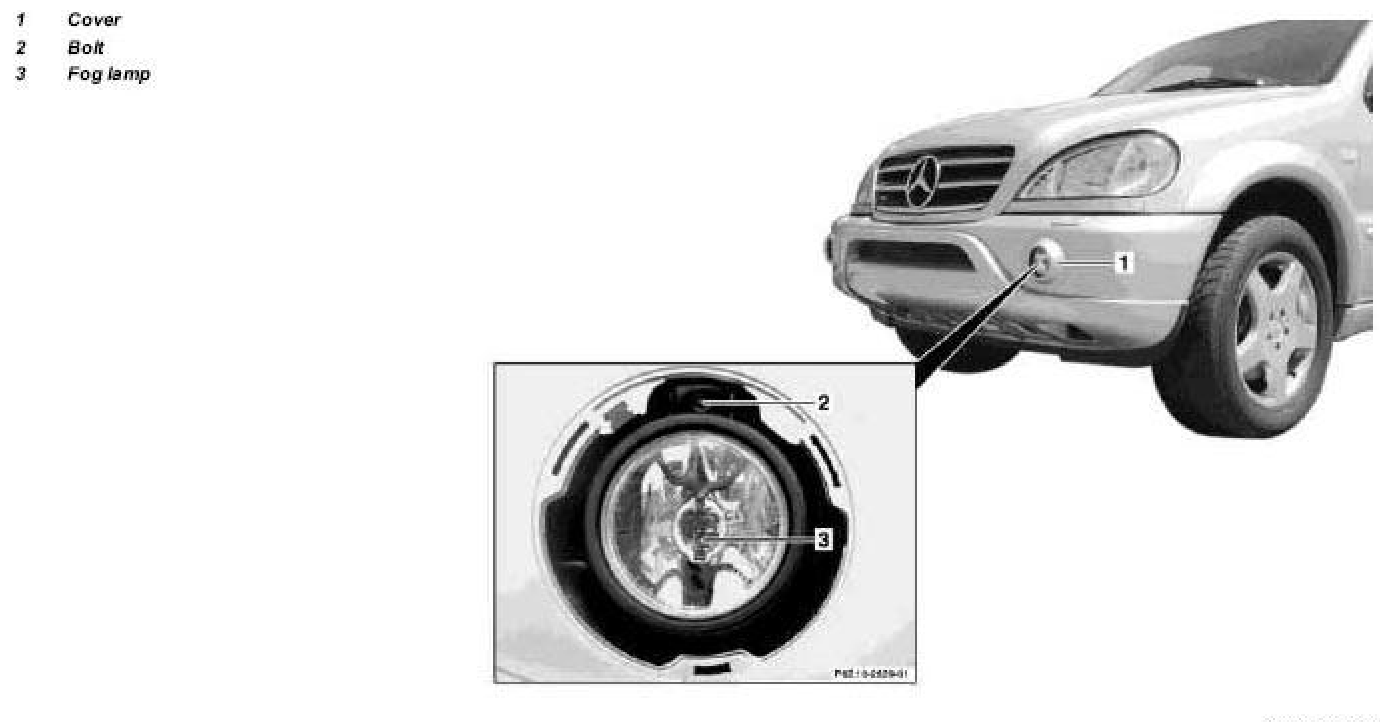


Fig. 166: Identifying Fog Lamp Components

	Remove/Install		

1	Remove cover (1)		
2	Unscrew bolt (2)		
3	Remove fog lamp (3) from bumper		
4	Disconnect connector		
5	Install in the reverse order		

REMOVE/INSTALL FOG LAMP - AR82.10-P-5103GI

MODELS 163.113/154#A as of 289565, 163.113 /154 #X as of 754620, 163.128/157/175

1 *Lever*
2 *Fog lamp*
3 *Electrical connector*
4 *Grommets*

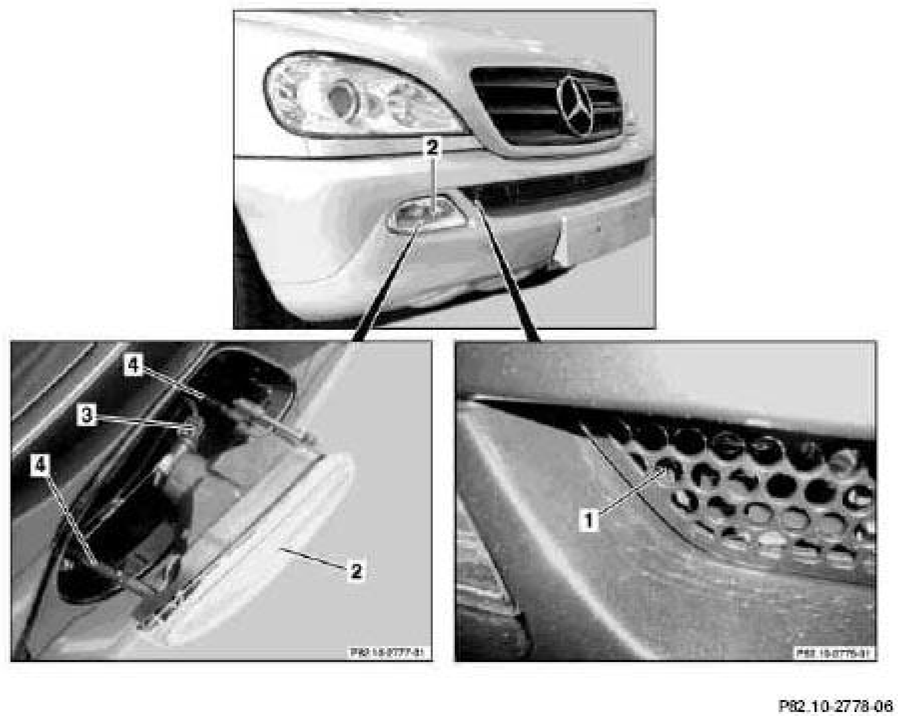


Fig. 167: Identifying Fog Lamp Components

	Remove/install		
1	Press lever (1) to release the fog lamp (2)	Pulling hook	**Fig. 168**
2	Disconnect fog lamp (2) from front bumper	Exercise caution when pulling at the edges of the fog lamp. **Installation:** First notch in the fog lamp at the edges. Ensure that the lever (1) securely holds the fog lamp in place.	

		Pulling hook	**Fig. 168**
3	Disconnect electrical connector (3) from fog lamp		
4	Pull off grommets (4)	**Installation:** Ensure that the grommets are installed loosely and without kinks.	
5	Install in the reverse order		
6	Check fog lamp adjustment and adjust if necessary		
AP	Check and correct headlamp adjustment		**AP82.10-P-8260GH**

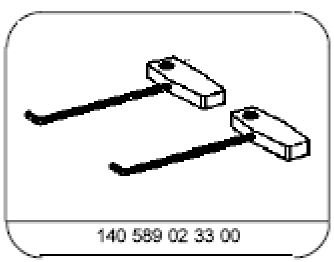


Fig. 168: Identifying Pulling Hooks (140 589 02 33 00)

REMOVING AND INSTALLING LICENSE PLATE LAMPS - AR82.10-P-5161GH

MODEL 163

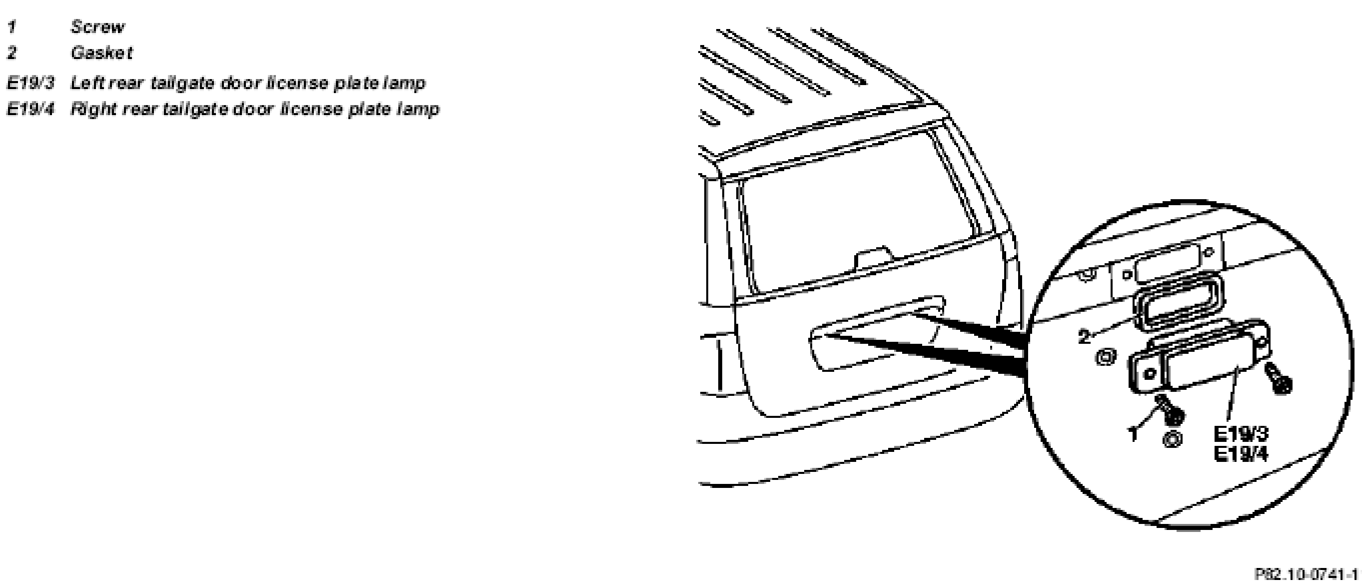


Fig. 169: Identifying License Plate Lamp Components

	Removal, installation		
1	Unscrew screws (1)		
2	Pry out license plate lamp (E19/3, E19/4) with suitable tool	i e.g. plastic wedge	
3	Reinstall in opposite order	i **Installation:** Check gasket (2) for license plate lamp for condition and proper seating.	
4	Check for proper function		

REMOVING AND INSTALLING CENTER HIGH-MOUNTED STOP LAMP - AR82.10-P-5375GH

MODEL 163

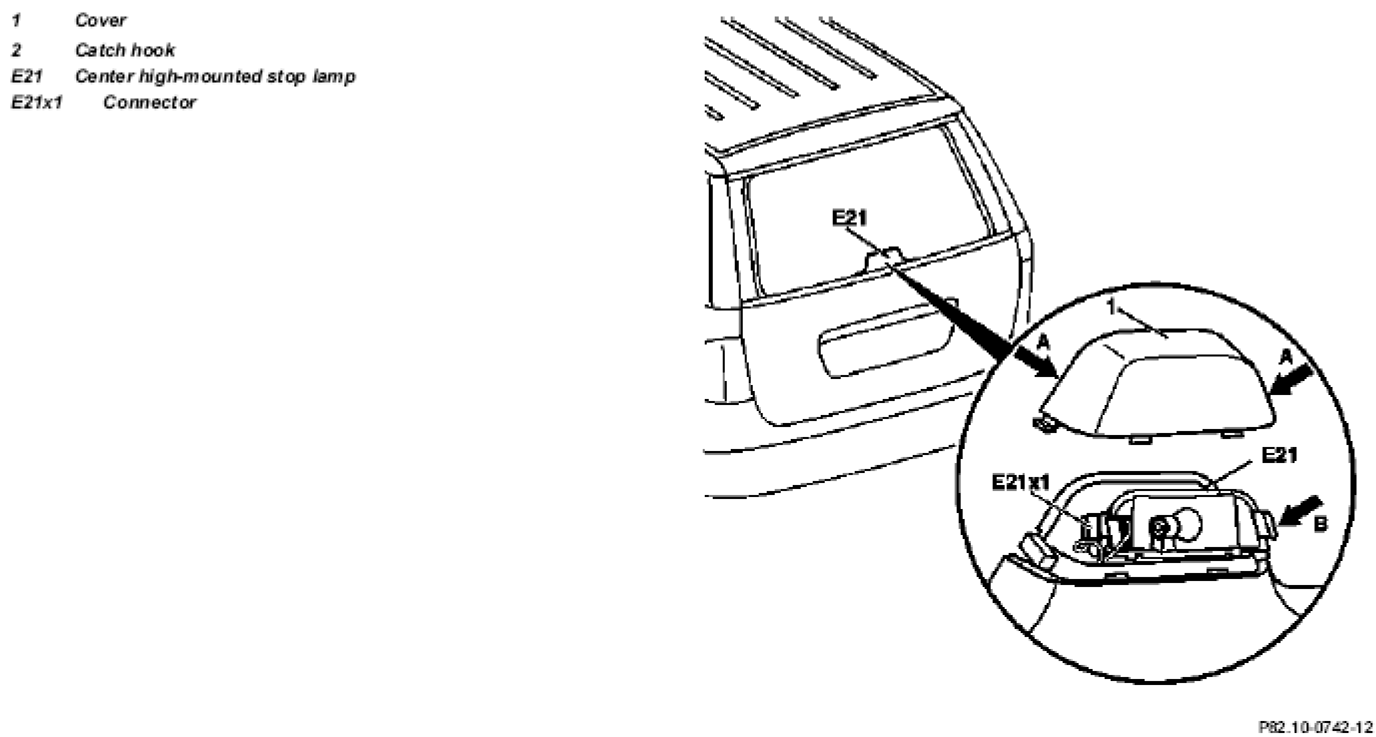


Fig. 170: Identifying Center High-Mounted Stop Lamp Components

	Removal, installation		
1	Open tailgate		
2	Remove cover (1) for center high-mounted stop lamp(E21)	i Press cover in on right and left (arrow A) until catch hooks (2) are	

		released	
3	Disconnect electrical connector (E21x1)		
4	Release center high-mounted stop lamp on left (arrow B) and twist to right out of housing		
5	Reinstall in opposite order		
6	Check for proper function		

REMOVE/INSTALL TELESCOPING NOZZLE FOR HEADLAMP CLEANING SYSTEM - AR82.15-P-6100GH

MODELS 163.113 /128 /154 /157 /172 /175 with CODE (600a) Headlamp cleaning system

MODEL 163.174

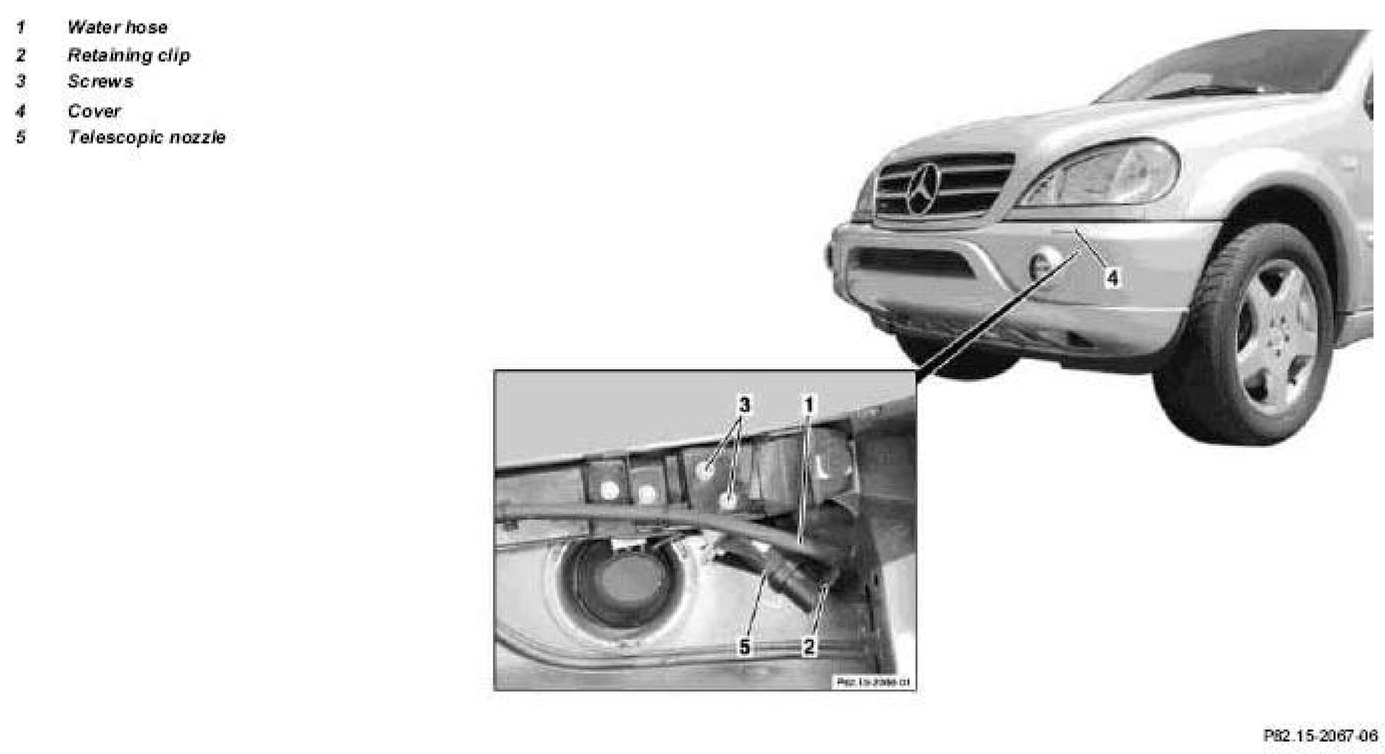


Fig. 171: Identifying Headlamp Cleaning System Components

	Remove/Install		
1	Remove the front bumper	with visual enhancement package, code U49. As of VIN A289565, X754620.	**AR88.20-P-2000GI** **AR88.20-P-2000GJ**

2	Remove retaining clip (2) and water hose (1) from telescopic nozzle		
3	Unscrew screws (3) from mount of telescopic nozzle		
4	Remove cover (4) from telescopic nozzle	i Risk of breakage! i Press telescopic nozzle upward to obtain access to the retaining lugs for the cover from above	
5	Remove telescopic nozzle (5) together with mount		
6.1	Remove mount from telescoping nozzle	i Only when the telescopic nozzle is replaced.	
7	Install in the reverse order		

REMOVING AND INSTALLING FRONT DOME LAMP - AR82.20-P-0110GH

MODEL 163

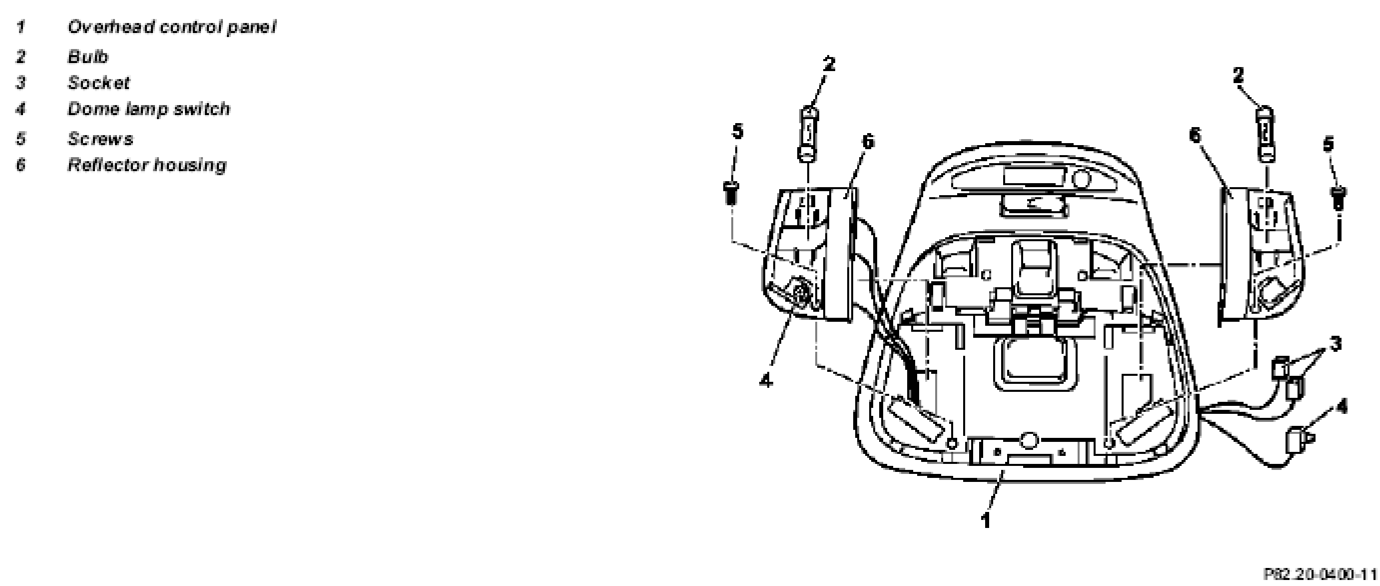


Fig. 172: Identifying Front Dome Lamp Components

	Removal, installation		
1	Remove overhead control panel (1)		**AR82.20-P-1100GH**
2	Remove bulb (2)		

3	Release socket (3) for bulb (2) by pressing in	[i] The bulb socket is clipped to the overhead control panel.	
4	Pull dome lamp switch (4) off of reflector housing (6)		
5	Unscrew screws (5) from reflector housing (6) on left and right on overhead control panel (1)		
6	Pry reflector housing (6) out of overhead control panel (1)	Avoid damaging reflector housing	
7	Reinstall in opposite order		

CHANGE REAR DOME LAMP - AR82.20-P-0113-01GH

1. Put dome lamp on workbench.
2. Remove all stiffening ribs (1) on edge.

Only for vehicles with lamella roof, code 417a.

3.1 Measure 13 mm (a) from the front edge and mark.

Only for vehicles with lamella roof, code 417a.

4.1 Cut dome lamp at the mark.
5 Deburr all cutting edges.

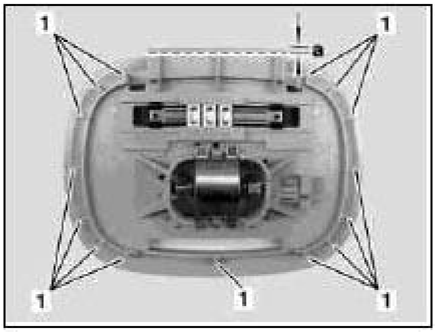


Fig. 173: Identifying Rear Dome Lamp Stiffening Ribs On Edge

REMOVE/INSTALL REAR DOME LAMP - AR82.20-P-0113GH

MODEL 163.113 /128 /136 /154 /157 /172 /174 /175

Shown on model 163 without Parktronic system (PTS), code 220a

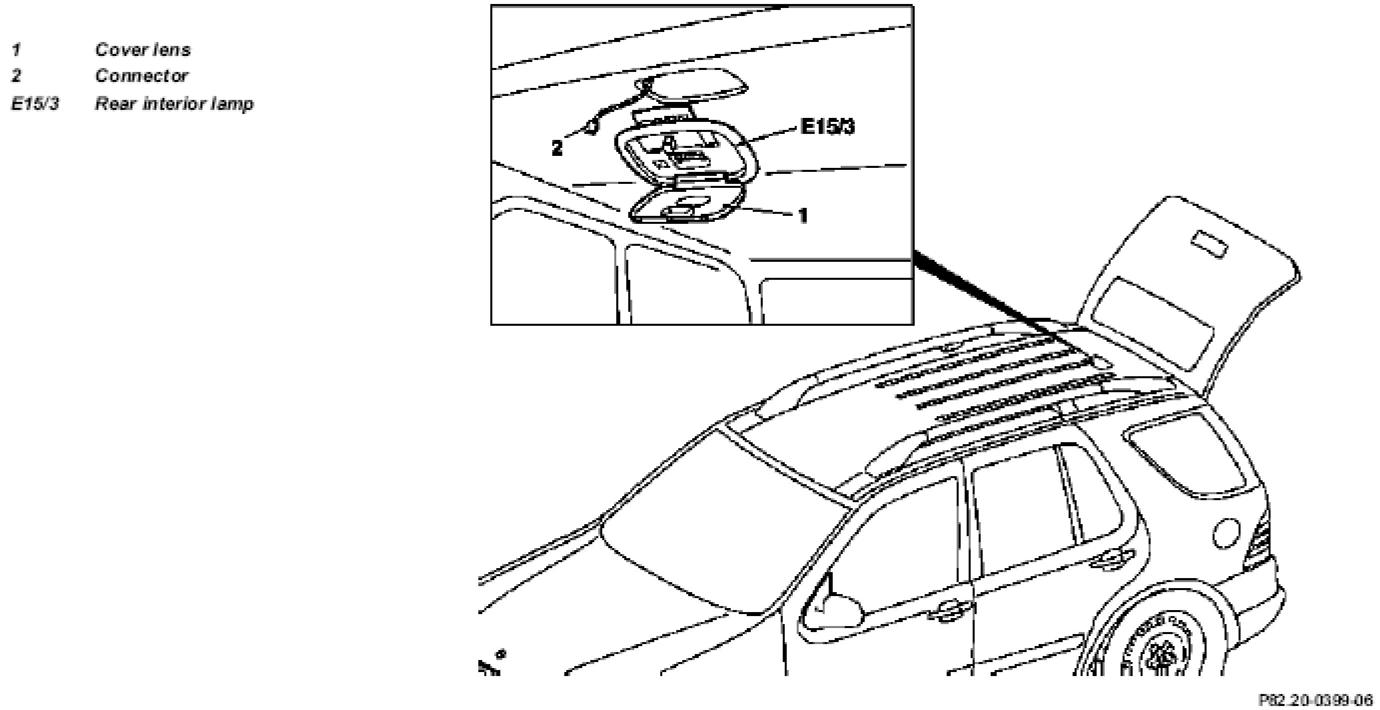


Fig. 174: Identifying Rear Dome Lamp Components

	Remove/Install		
1	Prize off glass cover (1) of the rear interior lamp (E15/3) and fold up until it reaches the limit stop		
2.1	Disconnect connector from Parktronic system warning display	Only with Parktronic system (PTS), code 220a.	
3	Remove rear interior lamp (E15/3) from inside roof lining	For removal pull dome lamp on rear housing edge downward and simultaneously forward.	
4	Remove connector (2) from rear interior lamp (E15/3)		
5	Install in the reverse order	**Installation:** If dome lamp is replaced in models 163.113 /128 /136 /154 /172 /174 /175	

		without Parktronic system (PTS), code 220a up to vehicle identification number A346574: ? Changing dome lamp in the rear	**AR82.20-P-0113-01GH**
BT	Changing dome lamp in the rear		BT82.20-P-0001-03GH

REMOVE/INSTALL FRONT OVERHEAD CONTROL PANEL - AR82.20-P-1100GH

MODEL 163.113 /128 /136 /154 /157 /172 /174 /175

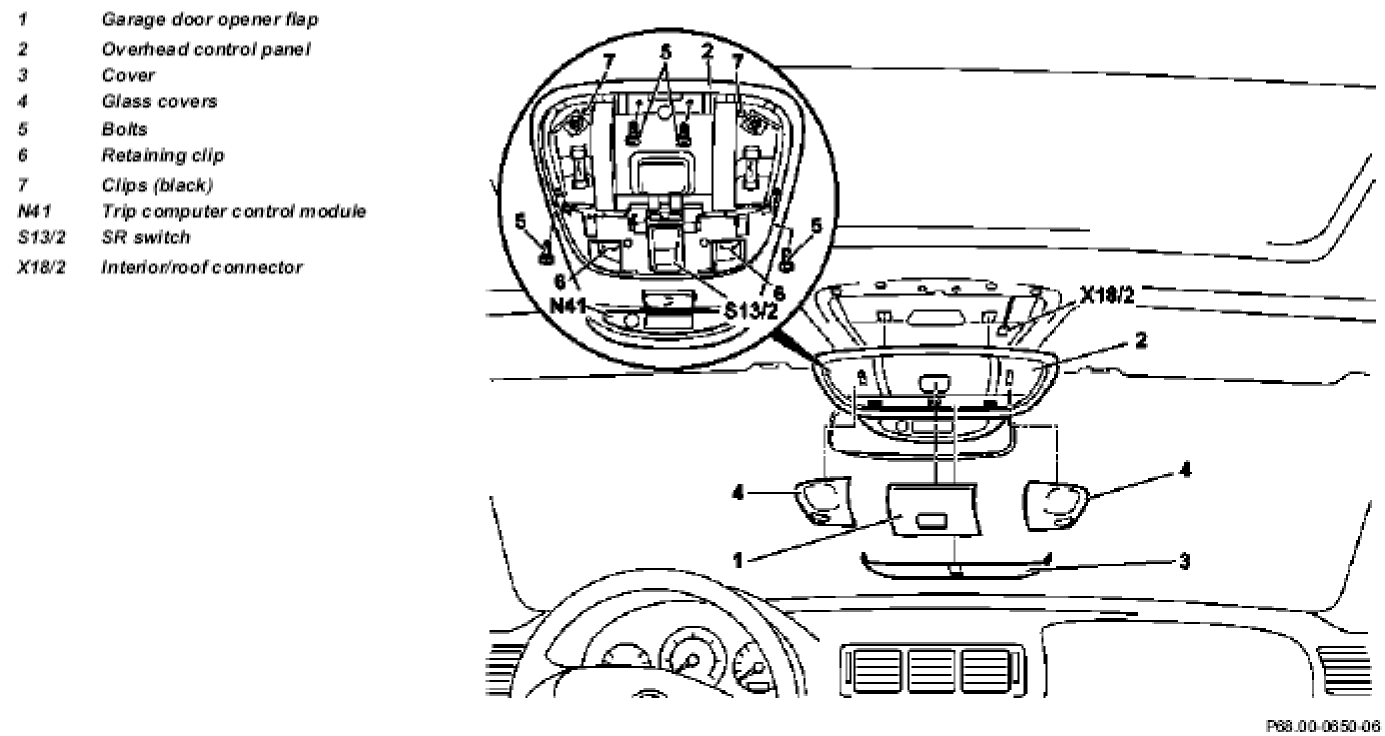


Fig. 175: Identifying Front Overhead Control Panel Components

	Remove/install		
1	Remove garage door opener flap (1) from overhead control panel (2)		
2	Unclip cover (3) on the sliding/tilting roof switch (S13/2)	i 4 clips.	
3	Unclip glass covers (4) from interior lights		
4	Unscrew screws (5)		

	below garage door opener flap (1) and glass covers (4)		
5	Unclip clips (black) (7) next to the light switches	**Installation:** Counterhold mounting plate with puller hooks inside of headliner. Hooked extraction tool	Fig. 168
6	Press both retaining clips (6) to rear and simultaneously press overhead control panel (2) to front	Position narrow plastic wedge or screwdriver in front of retaining lugs.	
7	Remove overhead control panel (2) downward		
8	Remove sliding/tilting roof switch (S13/2)		AR77.20-P-0001GH
9.1	Remove trip computer control module (TRIP) (N41)	With code 245, trip computer, only.	AR54.50-P-0001GH
10	Detach interior/roof connector (X18/2) from overhead control panel (2)		
11	Remove overhead control panel (2)		
12	Install in the reverse order		

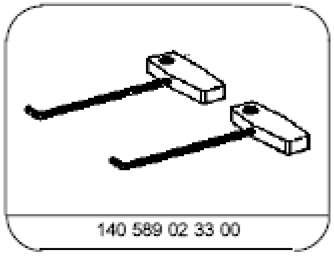


Fig. 176: Identifying Hooked Extraction Tool (140 589 02 33 00)

REMOVING AND INSTALLING WIPER ARM - AR82.30-P-6100GH

MODEL 163.113 /128 /136 /154 /157 /172 /174 /175

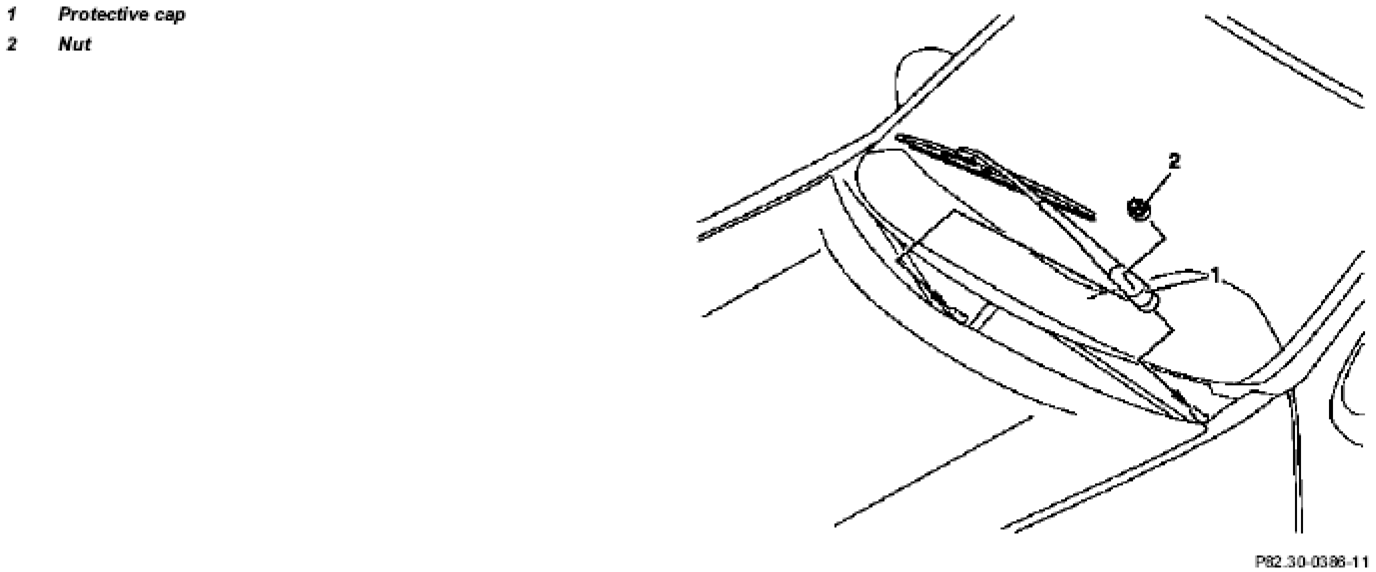


Fig. 177: Identifying Wiper Arm Components

	Remove/install		
Danger!	**Injury hazard** by trapping or crushing, in extreme cases with loss of limbs when reaching into windshield wiper mechanism	Always remove ignition key when working on windshield wiper mechanism.	**AS82.30-Z-0001-01A**
1	Ensure that wiper motor is in park position		
2	Open protective cap (1)		
3	Unscrew nut (2)	Nm	***BA82.30-P-1002-01C**
4	Takeoff wiper arm	Hold wiper arm on mounting section to avoid hitting against windshield.	
5	Install in the reverse order		

Nm Windshield wipers

Number	Designation	Model Series 163
BA82.30-P-1002-01C	Nut for wiper arm on windshield Nm	18

REMOVE/INSTALL WIPER SYSTEM - AR82.30-P-6400GH

MODEL 163.113 /128 /136 /154 /157 /172 /174 /175

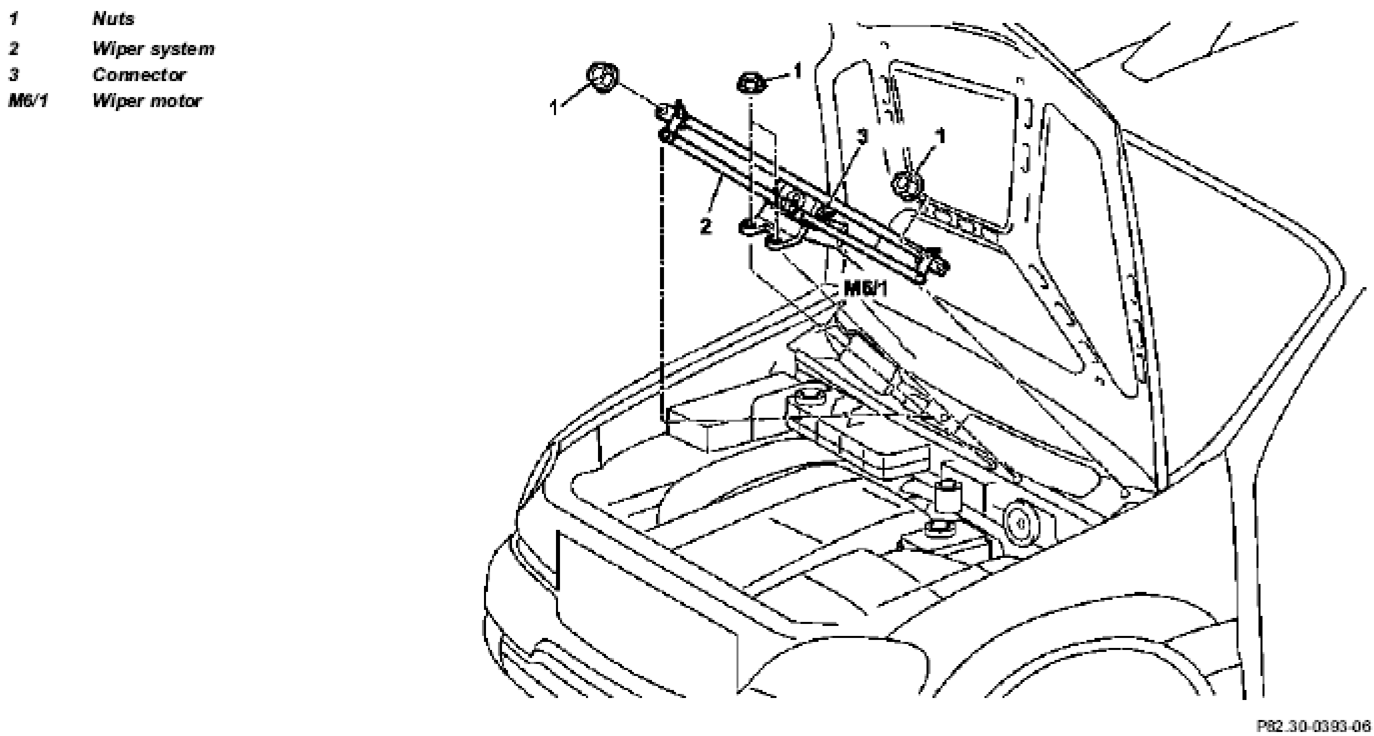


Fig. 178: Identifying Wiper System Components

	Remove/install		
⚠ Danger!	**Injury hazard** by trapping or crushing, in extreme cases with loss of limbs when reaching into windshield wiper mechanism	Always remove ignition key when working on windshield wiper mechanism.	**AS82.30-Z-0001-01A**
1	Ensure that wiper motor is in park position		
2	Remove cover on air intake		**AR83.25-P-1405GH**
3	Unscrew nuts(1) on wiper arm		
4	Lift wiper system (2)		
5	Disconnect connector (3) from the wiper motor (M6/1)		
6	Remove wiper system (2)		
7	Install in the reverse order		

MOVE WIPER MOTOR TO PARKING POSITION - AR82.30-P-6800-01E

Illustrated on model 163

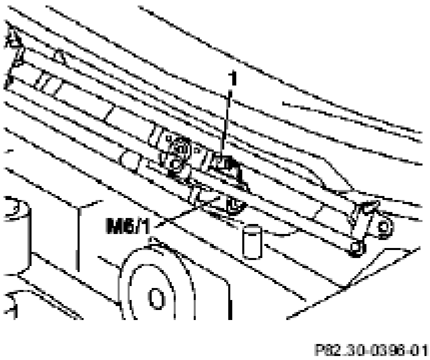


Fig. 179: Identifying Wiper Motor Connector And Wiper Motor

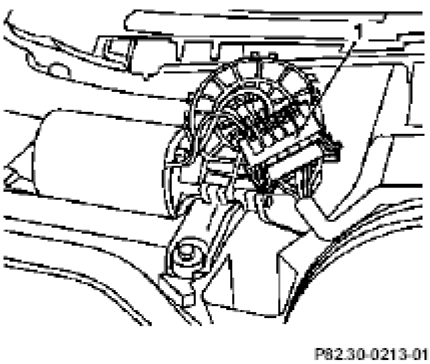


Fig. 180: Identifying Wiper Motor Connector

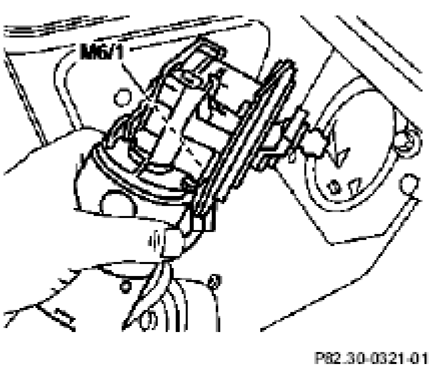


Fig. 181: Identifying Wiper Motor

1. Connect wiper motor (M6/1) to wiper motor connector (1).
2. Hold wiper motor (M6/1) using the left hand.
3. Switch on ignition.
4. Set combination switch to "stage 1".
5. Turn combination switch back to "level 0".

6. If the wiper motor (M6/1) is in the park position, switch off the ignition.
7. Detach wiper motor connector (1) from wiper motor (M6/1).

REMOVING AND INSTALLING WIPER MOTOR - AR82.30-P-6800GH

MODEL 163

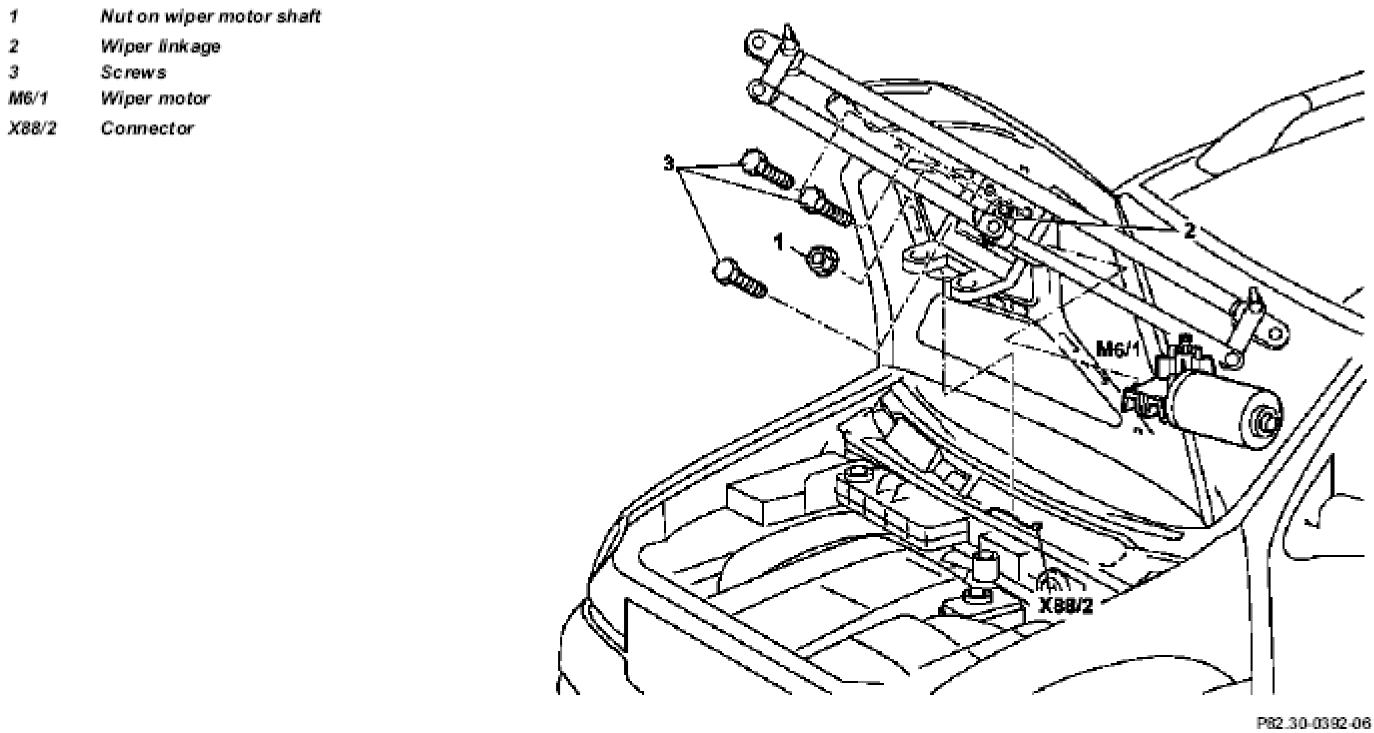


Fig. 182: Identifying Wiper Motor Components

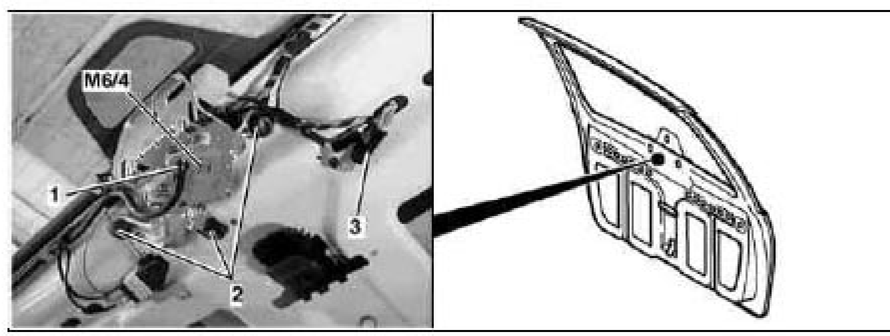
	Removal, installation		
Danger!	**Injury hazard** from pinching and crushing, in extreme cases extremities can even be cut off when caught in windshield wiper mechanism.	Always remove ignition key before working on windshield wiper mechanism.	**AS82.30-Z-0001-01A**
1	Remove cover on air intake		**AR83.25-P-1405GH**
2	Remove wiper system		**AR82.30-P-6400GH**
3	Unscrew nut on wiper motor shaft (1)	**Installation:** Align lever on wiper motor shaft vertically downward.	
4	Unscrew screws (3) on		

	wiper linkage (2) to wiper motor (M6/1)		
5	Disconnect connector (X88/2)	i **Installation:** Move wiper motor to park position	**AR82.30-P-6800-01E**
6	Remove wiper motor (M6/1)		
7	Reinstall in opposite order		

REMOVING AND INSTALLING REAR WINDOW WIPER MOTOR - AR82.30-P-6900GH

MODEL 163

1	Connector for washing water line
2	Rear wiper motor screw
3	Connector
M6/4	Rear window wiper motor



P82.30-0351-04

Fig. 183: Identifying Rear Window Wiper Motor Components

	Removal, installation		
⚠ Danger!	**Injury hazard** from pinching and crushing, in extreme cases extremities can even be cut off when caught in windshield wiper mechanism.	Always remove ignition key before working on windshield wiper mechanism.	**AS82.30-Z-0001-01A**
1	Move wiper motor to park position		**AR82.30-P-6800-01E**
2	Remove line on tailgate		**AR72.20-P-3520GH**
3	Remove wiper arm on tailgate		**AR82.30-P-6910GH**
4	Remove center high-mounted stop lamp		**AR82.10-P-5375GH**
5	Disconnect connector (3)		
6	Disconnect washing water line from connector (1)		

7	Unscrew screw for wiper system on tailgate (2)		
8	Remove rear window wiper motor (M6/4)	[i] **When installing:** Replace rear window grommet if necessary, observe installation position	
9	Reinstall in opposite order		

REMOVING AND INSTALLING TAILGATE WIPER ARM - AR82.30-P-6910GH

MODEL 163

1 Cover
2 Wiper arm nut
3 Wiper arm in park position

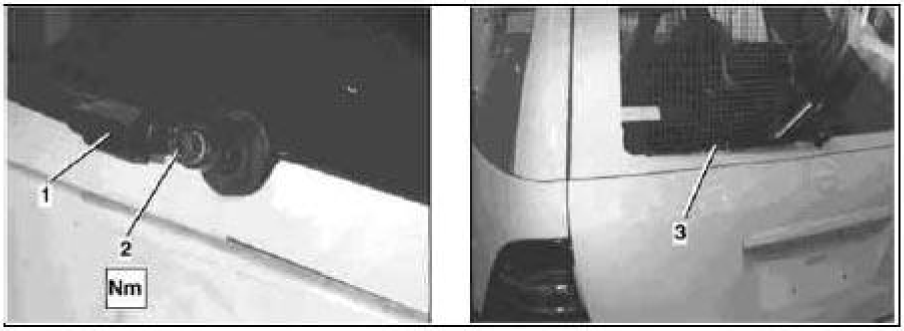


Fig. 184: Identifying Tailgate Wiper Arm Components

	Removal, installation		
Danger!	**Injury hazard** from pinching and crushing, in extreme cases extremities can even be cut off when caught in windshield wiper mechanism.	Always remove ignition key before working on windshield wiper mechanism.	**AS82.30-Z-0001-01A**
1	Open cover (1)	[i] Wiper motor must be in park position, if necessary ? move wiper motor to park position	**AR82.30-P-6800-01E**
2	Unscrew nut on wiper arm (2)	Caution, do not damage washer nozzle Nm	***BA82.30-P-1001-01C**
3	Remove wiper arm (3)	[i] Pivot wiper arm back and remove, if necessary ?	

			Fig. 185
4	Reinstall in opposite order	**When installing:** Attach wiper arms so that wiper arm points toward left (driver's side)	

Wiper

Number	Designation		Model 163
BA82.30-P-1001-01C	Nut for rear window wiper arm	Nm	15

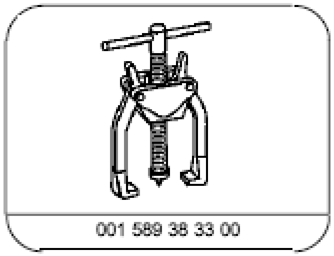


Fig. 185: Identifying Puller (001 589 38 33 00)

REMOVE/INSTALL RAIN SENSOR - AR82.30-P-7700GH

MODELS 163.113 /128 /154 /157 /172 /174 /175 with CODE (345a) Rain sensor

1 Inside rearview mirror
2 Plug-in wiring plug connection
B38 Rain sensor



P82.30-2103-06

Fig. 186: Identifying Rain Sensor Components

Modification notes

11.4.03	Disconnecting ground lead from battery newly included	Step 1	

	Remove/Install		
1	Disconnect ground cable of battery		**AR54.10-P-0003A**
2	Remove rearview mirror (1).	Models 163.154/172#A up to 145272, Models 163.154/172#X up to 708318	**AR68.40-P-0001GH**
		Models 163.154/172#A as of 145273, Models 163.154/172#X as of 708319, Models 163.113/128/157/174/175	**AR68.40-P-0001GI**
3	Disconnect electrical connector (2) from rain sensor(B38)		
4	Press retaining lugs (arrows) downward		
5	Remove rain sensor (B38)	Lens of rain sensor (B38) is bonded to the windshield and may	

		not be removed, otherwise this damages the lens.	
6	Install in the reverse order		

REMOVING AND INSTALLING WASHER FLUID RESERVOIR OF WINDSHIELD WASHER SYSTEM - AR82.35-P-6000GH

MODEL 163.113 /128 /136 /154 /157 /172 /174 /175 with 7.6 L reservoir

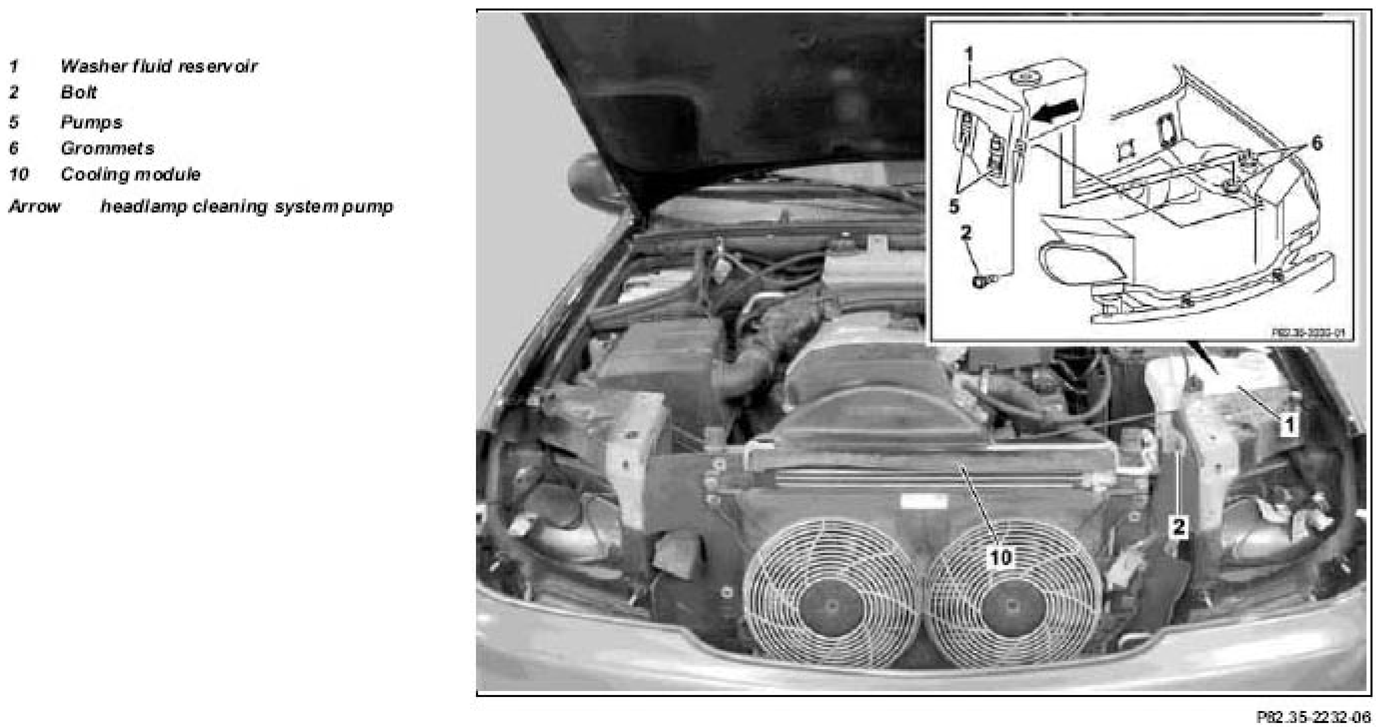


Fig. 187: Identifying Washer Fluid Reservoir Of Windshield Washer System Components

3 Air conditioning system hose
4 Clip



Fig. 188: Identifying Air Conditioning System Hose And Clip

	Remove/Install		
1	Remove upper frame cross member		**AR62.30-P-2300GH**
2	Drain the washer fluid reservoir	Manual pump	**Fig. 189**
3	Disconnect connectors and hoses from pumps (5)	i Loosen wiring harness from the side of the washer fluid reservoir. If fitted, disconnect plug from washer fluid level indicator switch.	
4	Unscrew bolt (2)		
5	Loosen air conditioning hose (3) from clip (4)		
6.1	Remove covers and locking clips from fuse and relay module	i Only Model 163.128.	
7	Detach cooling module (10) from lower grommets		
8	Remove washer fluid reservoir (1)	i Loosen washer fluid reservoir (1)from lower grommets (6). Lift up	

		cooling module with the help of an assistant. Press washer fluid reservoir inwards and pull straight upwards. **Installation:** Ensure that the washer fluid reservoir (1) is correctly seated in the grommets (6) and side clip.	
9	Install in the reverse order		

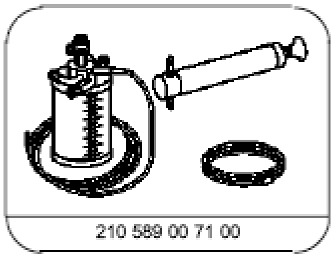


Fig. 189: Identifying Hand Pump (210 589 00 71 00)

CODING RADIO - AR82.60-P-7502-01A

1. If the radio is disconnected from the power supply, it is not operational when re-connected. After switching on the ignition and the radio, the readout CODE appears in the display.
2. The code number for the radio is advised to you on the enclosed CODE CARD.
3. To enter the first digit of the code number, you have to continue pressing station button 1 until the correct digit appears in the display. Adopt the same procedure for the second, third and fourth digits.
4. Once you have entered the correct code number with the station buttons 1, 2, 3, 4 and confirmed the entry with the SEEK button (press down), the readout CODE disappears. The radio can now be operated.
5. If you enter a wrong code three times, you must wait 15 minutes before making a new entry. In addition, if 9 incorrect entries are made, the radio will then not operate for 24 hours. During this time the radio and the ignition (terminal 15) must remain switched on.

CODING RADIO - AR82.60-P-7502-01B

1. If the radio is disconnected from the power supply, it cannot be operated by simply reconnecting. After switching on the ignition and the radio the word "CODE" appears in the display on the radio.
2. The code number for the radio is given on the enclosed CODE CARD.
3. Enter the code number with the station button, e.g. number 1, station button 1.

   i After entering the first number the word "CODE" disappears and the number entered appears followed by 4 dashes. The next character to be entered flashes. After entering all five numbers, the first character

starts flashing again. In this state the code number can be written over as frequently as desired. A correction can be made only by entering the complete code number again.

4. Confirm code number:

   Press TUNE, AUTO/SEEK or SC button. The radio automatically switches on and indicates the radio station or frequency stored with station button 1.

5. If an incorrect code number is entered and confirmed, the word "CODE" appears again on the display. If an incorrect code is entered three times the word "WAIT" appears on the display and the radio locks up for approx. 10 min. If the code is entered incorrectly three times again the radio locks up again for 10 min. Three more incorrect entries (a total of 9 incorrect attempts) increase the lock-up time to 60 min. Another three incorrect entries lock up the radio for another 60 min.

   The waiting time runs only when the radio is switched on.

CODING RADIO - AR82.60-P-7502-01GH

1. If the power supply to the radio is interrupted the radio will not operate when reconnected. After switching on the ignition the word "CODE" appears on the radio display.
2. The code number for this radio is given on the included code card.
3. Enter the code number with the station buttons, e.g. number 1 = station button 1..
4. After entering the first digit the word "CODE" disappears and the number entered is displayed followed by four dashes. Enter the next numbers with the corresponding station buttons. After entering the five digit code number compare the code number with the number on the display. At this point the code number can be written over as frequently as necessary for correction. If the wrong code number has been entered, enter the entire code number again.
5. Confirm entry of correct code number with " < " or " > " button.
6. If the wrong code number has been entered and confirmed the word "CODE" appears again on the display and the code must be entered again.
7. After entering the code incorrectly three times the word "WAIT" appears on the display and the radio is disabled for approx. 10 minutes. After entering the incorrect code three times again the radio is disabled for approx. 60 minutes.

   The disable time runs down only with the radio switched off.

REMOVE/INSTALL RADIO - AR82.60-P-7502EA

MODEL 129 with single-block unit, 2nd generation two-component unit control element and MB radios

MODEL 163 with CODE (257) Hi-Line radio with CODE (259) Premium radio with Bose sound system with CODE (352) COMAND operating and display system with CODE (353) Audio 30 APS with CODE (357) Navigation system - additional unit with CODE (522) Modular control system (MCS) radio USA with CODE (750) MB Audio 30 RDS radio with CODE (752) Becker Mexico 2000 radio with traffic news decoder with CODE (753) MB Audio 30 RDS radio with CODE (756) MB Audio 10 RDS radio with CD compartment

MODEL 168 with CODE (353) Audio 30 APS with CODE (750) MB Audio 30 radio with TP/RDS with CODE (752) MB Audio 30 radio without TP/RDS with CODE (753) MB Audio 10 CC radio with TP/RDS with CODE (754) MB Audio 10 CC radio without TP/RDS with CODE (756) MB Audio 10 CD radio with TP/RDS with CODE (758) MB Audio 5 radio with CODE (759) MB Audio 5 TP radio with RDS

MODEL 170 with CODE (510) MB Exquisite radio with traffic news decoder, with RDS (Becker) with CODE (512) MB Special radio with traffic news decoder, with RDS with CODE (515) MB Classic radio with traffic news decoder, with RDS with CODE (516) MB Classic radio without traffic news decoder with CODE (755) MB Special radio with CD tray

MODEL 202 with CODE (510) MB Exquisite radio with traffic news decoder, with RDS (Becker) with CODE (512) MB Special radio with traffic news decoder, with RDS with CODE (515) MB Classic radio with traffic news decoder, with RDS with CODE (516) MB Classic radio without traffic news decoder with CODE (750) Becker Europa 2000 radio with CODE (751) Becker Grand Prix 2000 radio with RDS

MODEL 208 with CODE (510) MB Exquisite radio with traffic news decoder, with RDS (Becker) with CODE (512) MB Special radio with traffic news decoder, with RDS with CODE (515) MB Classic radio with traffic news decoder, with RDS with CODE (516) MB Classic radio without traffic news decoder

MODEL MODEL 210 with CODE (510a) MB Exquisite radio with traffic news decoder, with RDS (Becker) with CODE (512a) MB Special radio with traffic news decoder, with RDS with CODE (515a) MB Classic radio with traffic news decoder, with RDS with CODE (516a) MB Classic radio without traffic news decoder with CODE (750a) MB Audio 30 RDS radio with CODE (753) MB Audio 30 RDS radio with CODE (756a) MB Audio 10 RDS radio with CD compartment

**MODELS
463.200 /204 /206 /207 /208 /209 /220 /221 /224 /225 /227 /228 /230 /231 /232 /233 /240 /241 /243 /244 /245 /2
with CODE (ER5) MB "Classic" radio or standard class stereo cassette radio with CODE (ER6) MB "Special" radio or mid-class stereo cassette radio with CODE (ER7) MB "Exquisite" radio or comfort class stereo cassette radio**

MODEL 414.700 with CODE (EF8) Sound 10 radio with CODE (EF9) Sound 20 radio with CODE (EG5) Sound 30 radio with CODE (EG6) Audio 10 comfort radio, D2B networked with CODE (EU0) Sound 30 radio with single CD drive with CODE (EF2) Audio 10 RDS with CD insertion slot

51 Removal assembly
A2 Radio

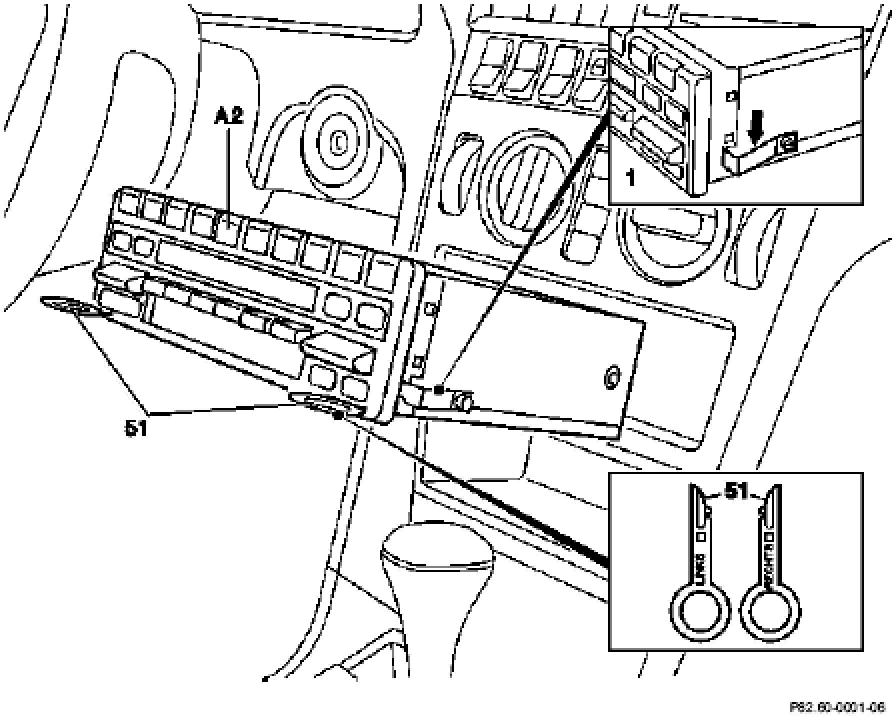


Fig. 190: Identifying Radio Components

	Remove/Install		
1	Disconnect battery ground cable	On model 163, 210, insulate cable terminal for ground lead to prevent unintentional contact between disconnected ground lead and ground point W10	**AR54.10-P-0003A**
		Model 463 except 463.241 with code 979	AR54.10-P-0003G
		Model 463.241 with code 979	AR54.10-P-0003PV
2	Pull out radio (A2)	Insert removal fixture (51) for this purpose. Push back retaining springs (arrow) on removed radio (A2) and pull out removal fixture (51).	**Fig. 191**
BT	MB radio	Model 202	BT82.60-P-9309-01A
BT	MB radio	as of 02/97	BT82.60-P-9309-01B

BT	MB radio	MODEL 129 as of 02/91	BT82.60-P-9309-01C
3	Disconnect electrical connectors		
4	Install in the reverse order		
5	Enter radio code	Code 750, 751	**AR82.60-P-7502-01A**
		Code 510a, 512a, 515a, 516a, 755, ER5, ER6, ER7	**AR82.60-P-7502-01B**
		Model 129	AR82.60-P-7502-01C
		Model 168, 414	AR82.60-P-7502-01GC
		Model 163	**AR82.60-P-7502-01GH**

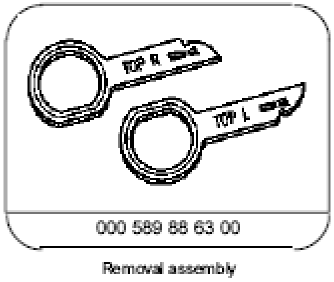


Fig. 191: Identifying Removal Assembly (000 589 88 63 00)

REMOVING AND INSTALLING CAN BUS ADAPTER - AR82.61-P-7413G

MODEL 163 with CODE (353) Audio 30 APS



Fig. 192: Identifying CAN Bus Adapter

	Removal, installation		
1	Remove cover on shift lever		**AR68.20-P-2310GH**
2	Disconnect electrical connector on CAN bus		

	adapter (5)		
3	Unscrew screws (2 each) from CAN bus adapter (5)		
4	Remove CAN bus adapter (5)		
5	Install in opposite order		
6	Check for proper function		

REMOVE/INSTALL ANTENNA FOR GLOBAL POSITIONING SYSTEM (GPS) ON VEHICLES WITH APS - AR82.61-P-7474GI

MODEL 163.113 /154 /172 /174 #A as of 145273 up to 289564, 163.113 /154 /172 #X as of 708319 up to 754619, 163.136/157 with CODE (353) Audio 30 APS with CODE (357) Navigation system - additional unit with CODE (349) E-call emergency call system

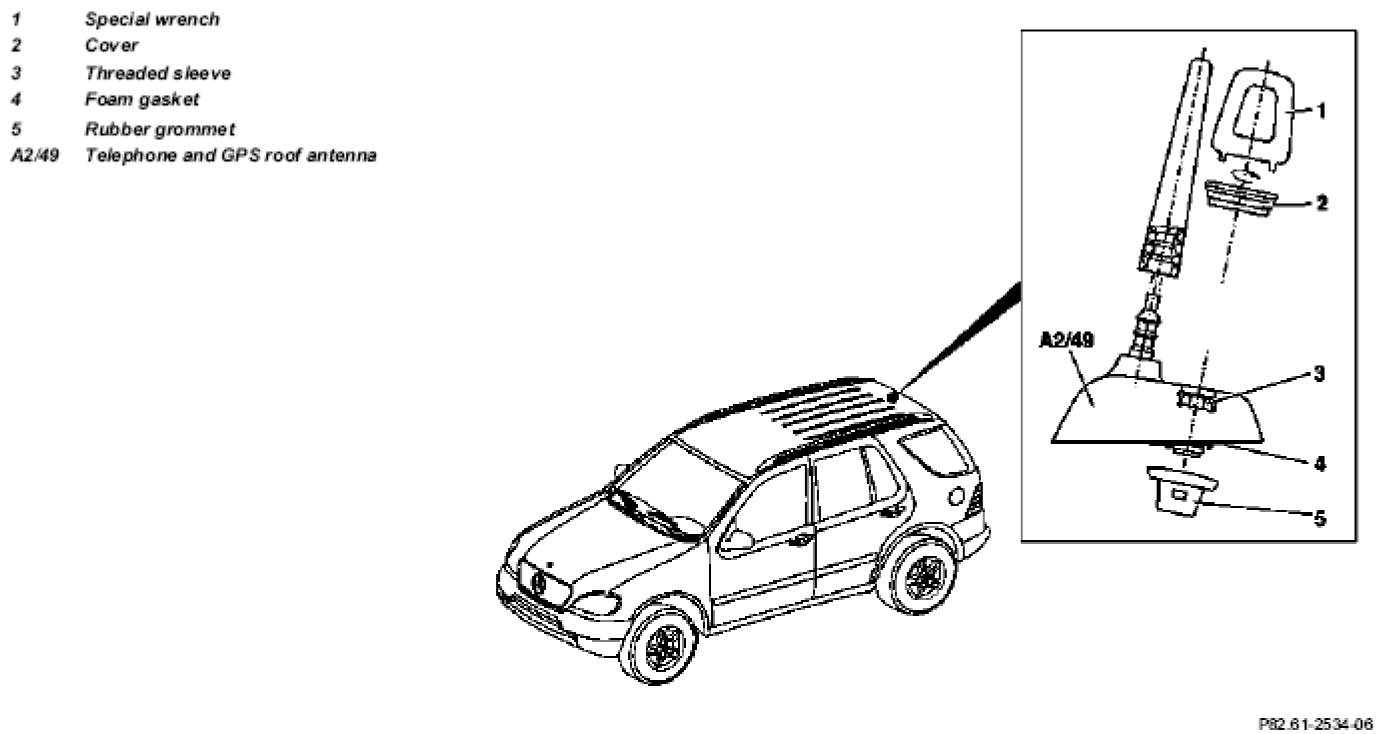


Fig. 193: Identifying Antenna For Global Positioning System On Vehicles With APS Components

	Remove/install		
	Information on preventing damage to electronic components due to electrostatic discharge		**AH54.00-P-0001-01A**
1	Unscrew cover (2) using special wrench (1)	**Installation:** Screw in cover (2) until it is flush	

		with the antenna surface. [i] Special wrench (1) is included in the installation kit.	
2	Unscrew threaded sleeve (3)		
3	Disconnect telephone and GPS roof antenna (A2/49)	[i] **Installation:** Install new rubber grommet (5). Ensure that the grommet is in the correct installation position. No longer use foam gasket (4).	
4	Install in the reverse order		

CHECK MICROPHONE FOR SOUND AMPLIFIER - AR82.62-P-1110GH

MODELS 163.113 /154 /174 #A as of 289565, 163.128 /157 /175 with CODE (810) Sound system

◁◗	**Inspect**		
1	Connect STAR DIAGNOSIS		***WH58.30-Z-1048-13A** ***WH58.30-Z-1052-13A**
2	Select **Actual values** in menu **SOUND - Sound system**		
3	Select **Microphone test: B25/6 (sound amplifier microphone)**	[i] Follow the instructions on the screen for every test in order to determine the source of fault. Carry out repair against a separate order.	

Commercially available tools

Number	Designation	
WH58.30-Z-1048-13A	STAR DIAGNOSIS diagnosis system, Compact Passenger Car	6511 1801 00
WH58.30-Z-1052-13A	STAR DIAGNOSIS 16-pin connecting cable	651 112 40 99

REMOVING AND INSTALLING MICROPHONE - AR82.62-P-7700GH

MODELS 163.113 /154 /174 #A as of 289560, 163.113 #X as of 754620, 163.128 /157 /175 with CODE (810) Sound system

1 Connector
B25/6 Sound amplifier microphone

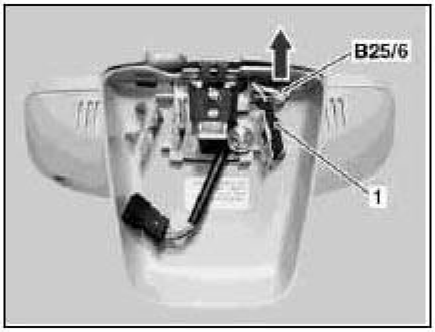


Fig. 194: Identifying Microphone Components

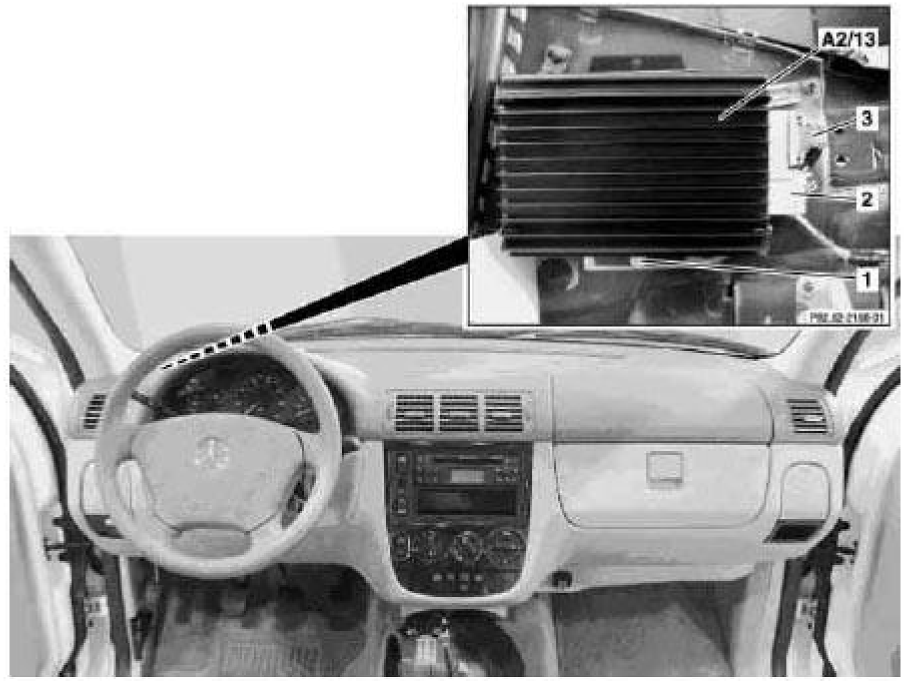
	Removal/installation		
1	Remove inside rearview mirror		**AR68.40-P-0001GI**
2	Unclip plug from bracket		
3	Remove sound amplifier (B25/6) microphone	i Do not damage wiring harness. i Withdraw microphone from above.	
4	Install in the reverse order		
5	Check sound amplifier microphone (B25/6)		**AR82.62-P-1110GH**

REMOVE/INSTALL LOUDSPEAKER AMPLIFIER CONTROL MODULE - AR82.62-P-7720GH

MODELS 163.113 /128 /136 /154 /157 /172 /175 with CODE (810) Sound system

MODEL 163.174

1	Bolt
2	Connector
3	Connector
A2/13	Sound amplifier



P82.62-2169-06

Fig. 195: Identifying Loudspeaker Amplifier Control Module Components

	Remove/Install		
1	Remove cover below instrument panel on left side	i Left-hand drive vehicle. i Right-hand drive vehicle.	**AR68.10-P-1500GH** **AR68.10-P-1520GI**
2	Unscrew screw (1) and detach Sound amplifier (A2/13) from bracket	i Lay insulation down to side.	
3	Disconnect connector (2, 3)	i As of VIN A289565, X754620: only one connector.	
4.1	Disconnect conductive coupling D2B	i Do not kink or stretch fiber optical cable. Press protective caps on conductive coupling and device connection. i As of VIN A289565, X754620.	**AR82.95-P-0005-01A**
5	Remove Sound amplifier (A2/13)	i Do not damage leads and insulation.	
6	Install in the reverse order		

REMOVE/INSTALL SPEAKER IN THE SIDE PANELING (REAR) - AR82.62-P-7837GH

MODEL 163.113 #A as of 289565, 163.113 #X as of 754620, 163.154 /174 #A as of 289565, 163.128 /157 /175 with CODE (810) Sound system

1	Rear roof frame paneling
2	Screws
3	Bracket
H4/7	Left rear speaker
H4/7x1	Left rear speaker connector
H4/8	Right rear speaker
H4/8x1	Right rear speaker connector

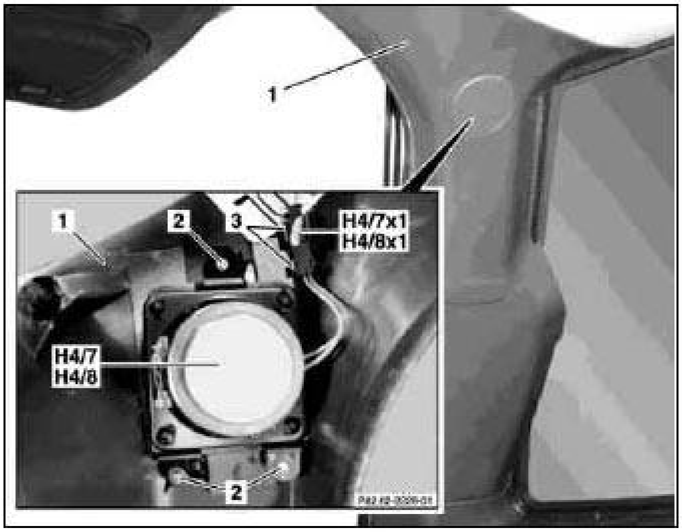


Fig. 196: Identifying Side Paneling Speaker Components (Rear)

	Remove/install		
1	Remove rear roof frame paneling (1)		**AR68.30-P-4470GH**
2	Remove screws (2) of left rear speaker (H4/7) or right rear speaker (H4/8) from side paneling		
3	Remove left rear speaker (H4/7) or right rear speaker (H4/8) from the side paneling	i Disconnect left rear speaker connector (H4/7x1) or right rear speaker connector (H4/8x1) from bracket (3)	
4	Install in the reverse order		

REMOVE/INSTALL WOOFER - AR82.62-P-7839GH

MODEL 163.113 /128 /136 /154 /157 /172 /175 with CODE (810) Sound system

MODELS 163.174

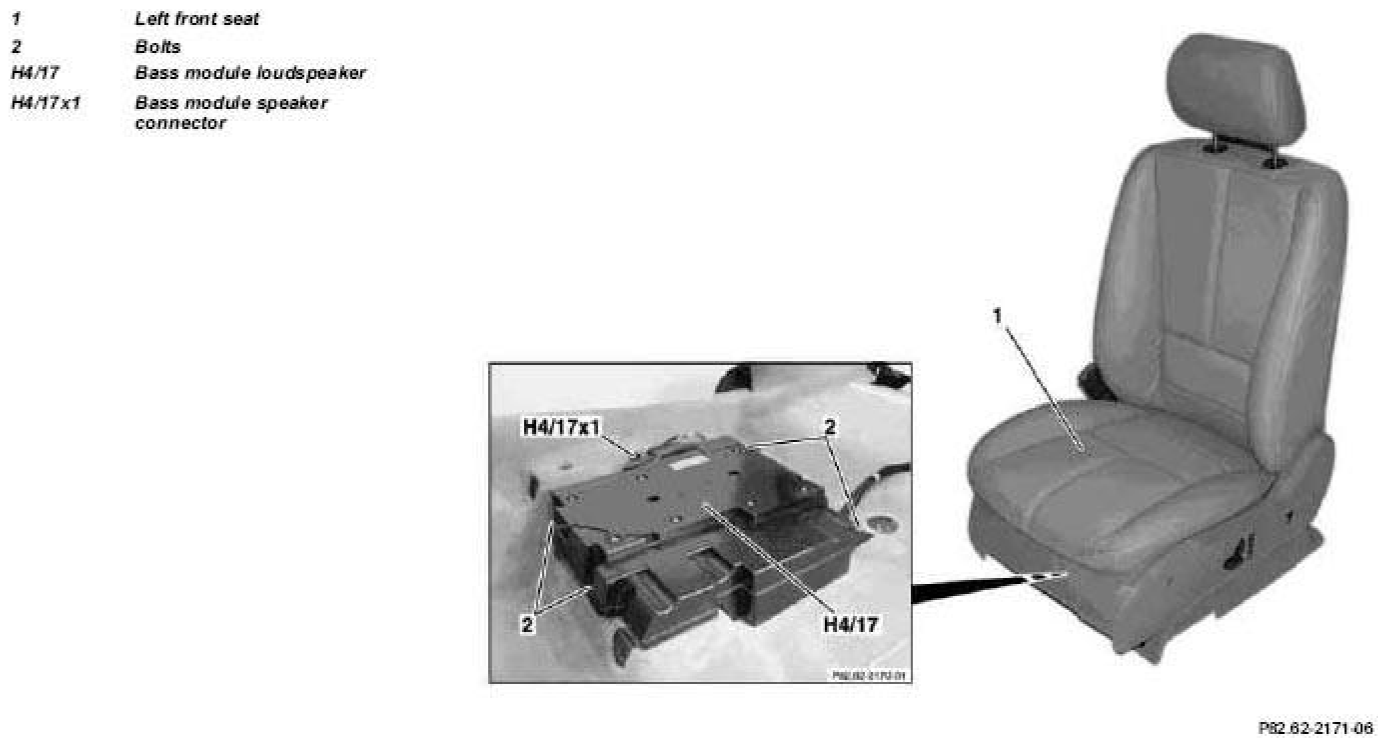


Fig. 197: Identifying Woofer Components

	Remove/install		
1	Unscrew screws on front seat console	Nm	***BA91.10-P-1001-01B**
2	Angle front seat back until it rests against the rear bench seat and fasten with outer seat belt	Cover the floor covering behind the front seat to avoid contamination.	
3.1	Remove air duct at the rear of the front seat	Only as of VIN A289565, X754620. 1 screw.	
4	Detach bass module speaker connector (H4/17x1)		
5	Unscrew screw (2)		
6	Remove bass module speaker (H4/17)		
7	Install in the reverse order		

Nm Front seats

Number	**Designation**		**Model Series 163**
BA91.10-P-1001-01B	Bolt of seating mounting bracket to vehicle floor	Nm	40

REMOVING AND INSTALLING LOUDSPEAKERS IN FRONT DOORS - AR82.62-P-7845GH

MODEL 163

1	Electrical connector
2	Screw
3	Loudspeaker housing
4	Screw
H4/5	Left front door speaker
H4/6	Right front door speaker

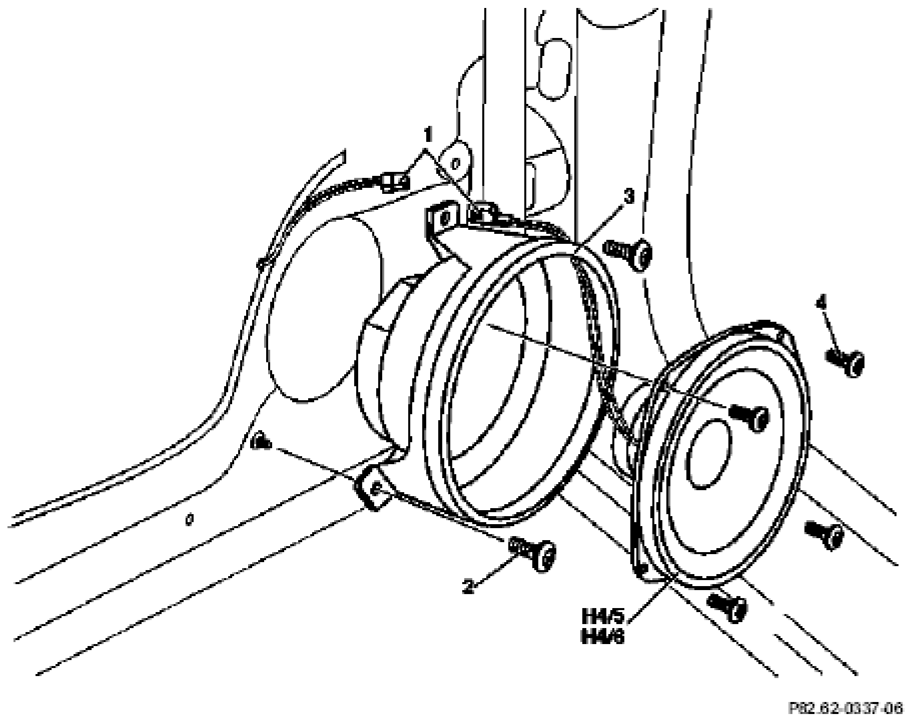


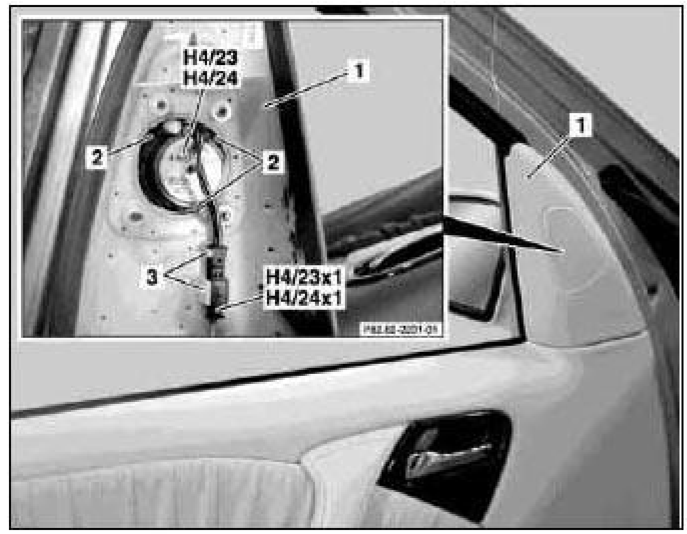
Fig. 198: Identifying Front Doors Loudspeakers Components

	Removal, installation		
i	Switch off radio		
1	Remove door liner on front door		**AR72.10-P-1000GH**
2	Disconnect electrical connector (1)		
3	Unscrew screws (2) and remove loudspeaker housing (3)		
4	Unscrew screws (4) and remove loudspeaker (H4/5, H4/6)		
5	Reinstall in opposite order		
6	Check for proper function	i Switch on radio, actuate balance control, check left and right loudspeakers	

REMOVE/INSTALL FRONT DOOR SPEAKERS IN MIRROR TRIANGLE - AR82.62-P-7850GH

MODELS 163.113 #A as of 289565, 163.113 #X as of 754620, 163.154 /174 #A as of 289565, 163.128/157/175

1	*Mirror triangle*
2	*Retaining clamps*
3	*Bracket*
H4/23	*Left front door speaker, mirror triangle*
H4/23x1	*Left front door speaker connector, mirror triangle*
H4/24	*Right front door speaker, mirror triangle*
H4/24x1	*Right front door speaker connector, mirror triangle*



P82.62-2232-11

Fig. 199: Identifying Mirror Triangle Front Door Speaker Components

	Remove/install		
1	Unclip mirror triangle (1) from door	Assembly wedge	**Fig. 200**
2	Disconnect left front door speaker connector, mirror triangle (H4/23x1) or right front door speaker connector, mirror triangle (H4/24x1) from left front door speaker, mirror triangle (H4/23) or right front door speaker, mirror triangle (H4/24)		
3	Remove retaining clips (2)		
4	Remove speaker from mirror triangle	Disconnect plug from bracket (3).	
5	Install in the reverse order		

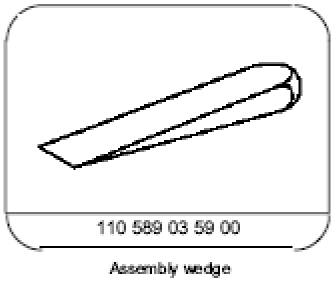


Fig. 200: Identifying Assembly Wedge (110 589 03 59 00)

REMOVING AND INSTALLING LOUDSPEAKERS IN REAR DOORS - AR82.62-P-7874GH

MODEL 163

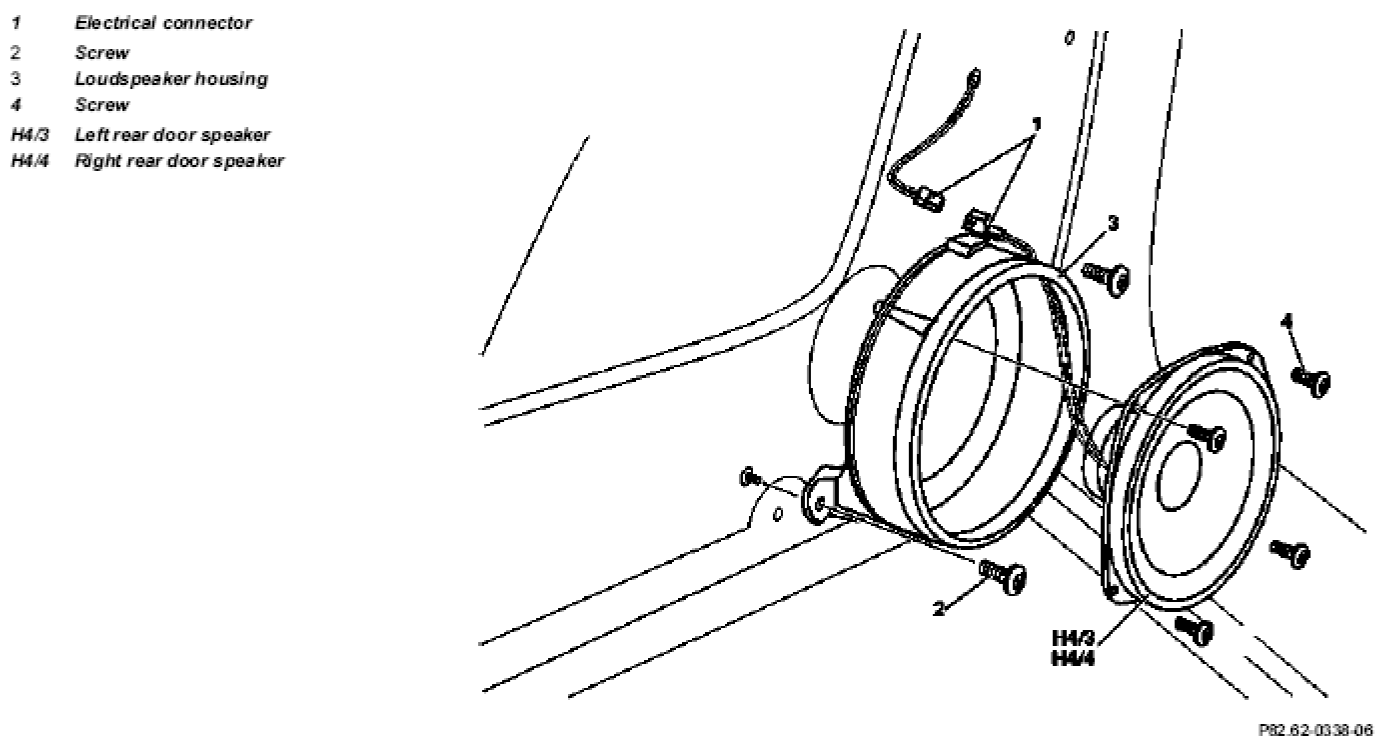


Fig. 201: Identifying Rear Doors Loudspeaker Components

	Removal, installation		
i	Switch off radio		
1	Remove door liner on rear door		**AR72.12-P-1010GH**
2	Disconnect electrical connector (1)		
3	Unscrew screws (2) and remove loudspeaker		

	housing (3)		
4	Unscrew screws (4) and remove loudspeaker (H4/3, H4/4)		
5	Reinstall in opposite order		
6	Check for proper function	i Switch on radio, actuate balance control, check left and right loudspeakers	

REMOVE, INSTALL AM/FM AMPLIFIER - AR82.62-P-8347GH

MODEL 163

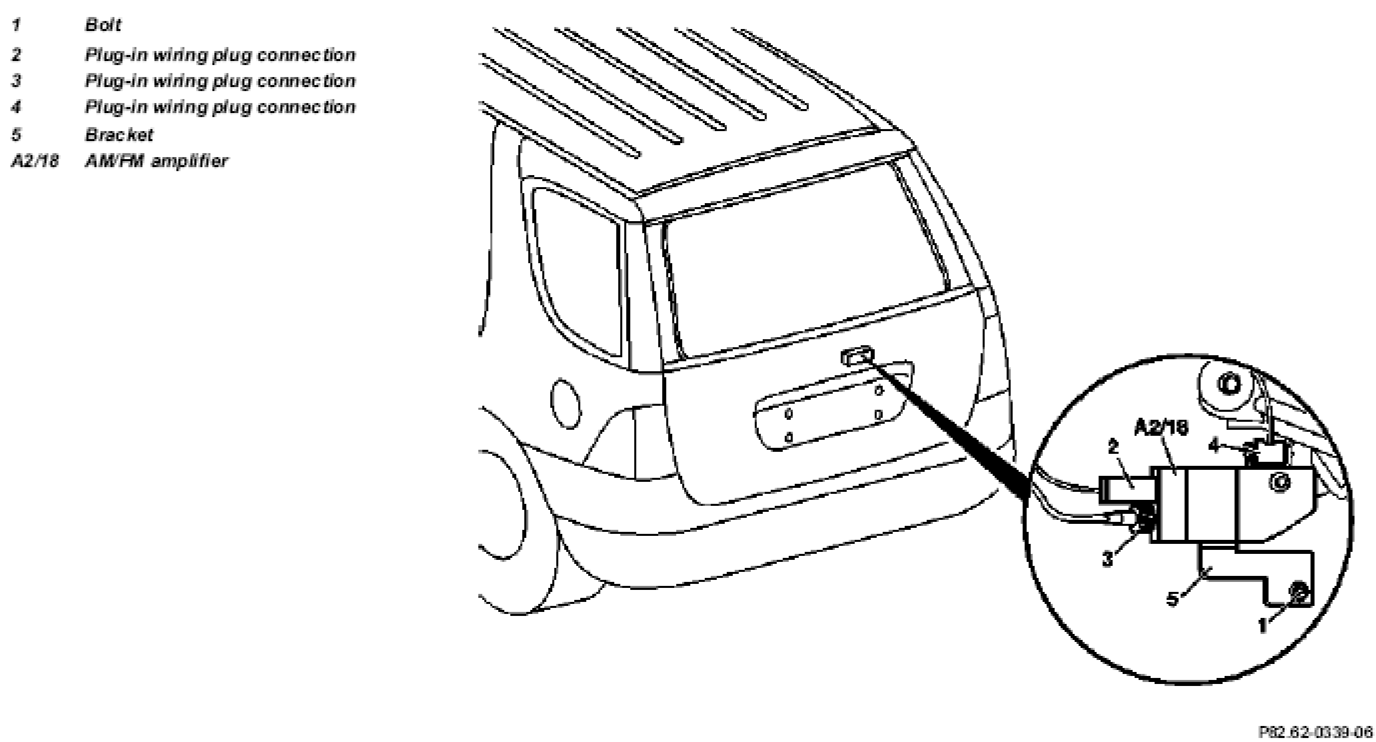


Fig. 202: Identifying AM/FM Amplifier Components

	Remove/install		
1	Open tailgate		
2	Remove liner on tailgate		**AR72.20-P-3520GH**
3	Disconnect electrical connectors (2, 3, 4)		
4	Unscrew screws (1)		
5	Remove AM/FM		

	amplifier (A2/18) with bracket (5)		
6	Install in the reverse order		
7	Perform function check		

REPLACE FIBER OPTICAL CABLE (D2B) BETWEEN RADIO AND SOUND AMPLIFIER (AFTER TESTING) - AR82.62-P-8350GH

MODEL 163.113 /154 /174 #A as of 289565, 163.113 #X as of 754620, 163.128 /157 /175 with CODE (810) Sound system

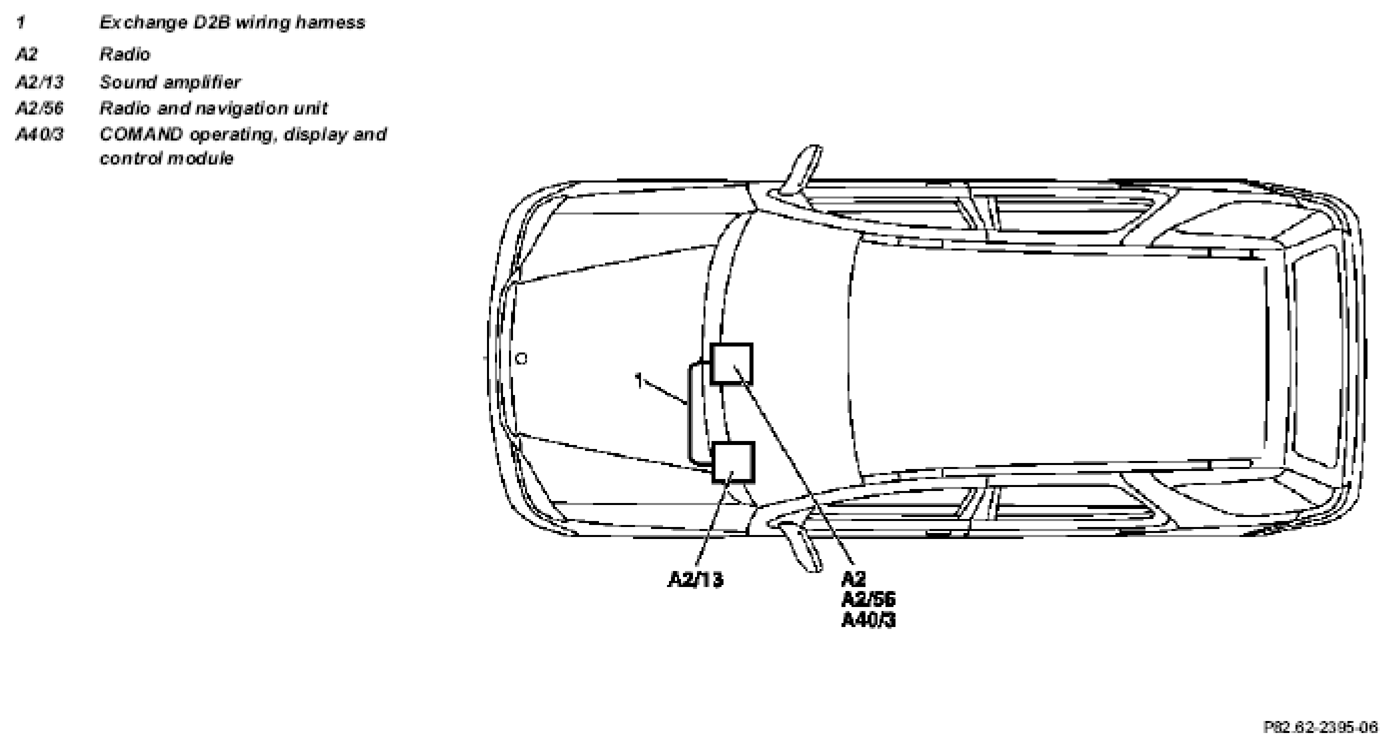


Fig. 203: Identifying Sound Amplifier, Radio And Navigation Unit



Fig. 204: Identifying ETC Control Module And Exchange D2B Wiring Harness

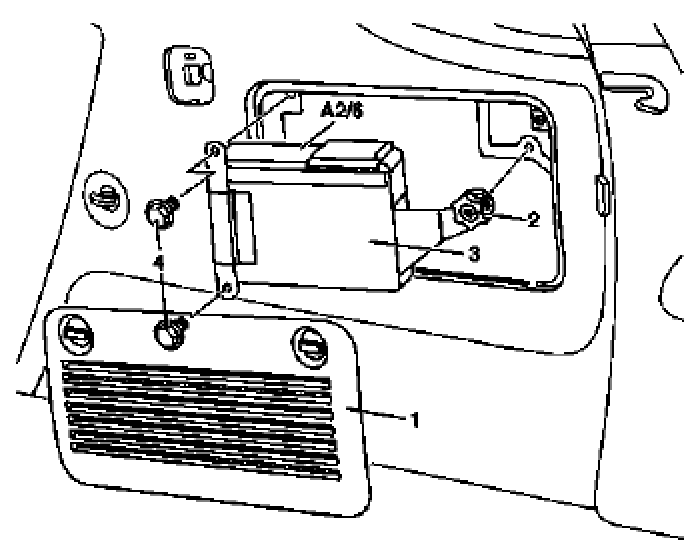
	Remove		
	Notes on fiber optic cable	Models 129, 163, 168, 170, 202, 203, 208, 209, 210,215,220,230,463	**AH82.70-P-0001-02A**
GF	Fiber optical cable, location	Model Series 163	**GF82.00-P-4000-01GH**
1	Remove radio (A2)		**AR82.60-P-7502EA**
2	Remove cover below instrument panel on driver's side		**AR68.10-P-1500GH**
3	Unscrew screw on Sound amplifier (A2/13) and disconnect D2B B-plug		
 4	**Install** Pull the red insert of the D2B-wiring harness out of the D2B-plug on the sound amplifier (A2/13) and replace with the red insert of the exchange D2B wiring harness	**Risk of breakage!** Do not kink or stretch fiber optic cable i Pay attention to the correct installation position of the insert in the D2B B-plug. Cut off the fiber optical cable removed at the adhesive tape.	AR82.70-P-0004-01A
5	Route the exchange D2B wiring harness (1) behind the instrument panel along the existing wiring harness to the bracket (2) for the ETC [EGS] control module (N15/3) / plug of the interior wiring harness		
6	Route the exchange D2B wiring harness (1) behind the bracket (2) for the ETC [EGS] control module (N15/3) to the clip (3) for the shift lock cable		
7	Route exchange D2B-wiring harness (1) to the radio installation opening		
8	Secure exchange D2B wiring harness (1) on		

	existing wiring harness at the red adhesive tape markings provided for this		
9	Pull the white insert of the D2B wiring harness out of the D2B plug on the radio and replace with the white insert of the exchange D2B wiring harness (1)	**Risk of breakage!** Do not kink or stretch fiber optic cable Pay attention to the correct installation position of the insert in the D2B B-plug. Cut off the fiber optical cable removed at the adhesive tape.	AR82.70-P-0004-01A
10	Secure exchange D2B wiring harness (1) on existing rear wiring harness in the radio installation opening		
11	Plug D2B plug into the sound amplifier (A2/13) and fasten the sound amplifier (A2/13) with a screw		
12	Remove cover below instrument panel on driver's side		**AR68.10-P-1500GH**
13	Install radio (A2)		**AR82.60-P-7502EA**

REMOVE/INSTALL CD PLAYER WITH CHANGER - AR82.64-P-7507GH

MODEL 163 with CODE (819) 6-disc CD changer

1 *Cover*
2 *Tommy screw*
3 *Bracket*
4 *Bolts*
A2/6 *CD player with changer (in trunk)*



P82.64-0206-11

Fig. 205: Identifying CD Player Components

3	Bracket
5	Electrical line
6	Retaining clips
7	Bolts
8	Electrical connector
A2/6	CD player with changer (in trunk)

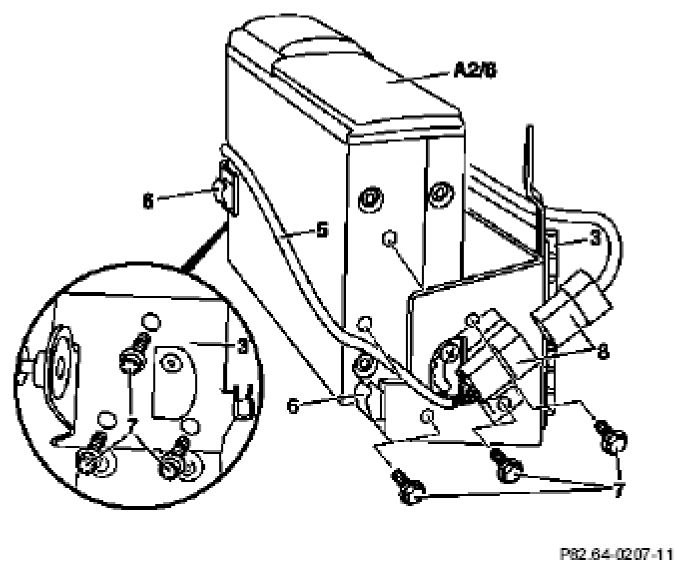


Fig. 206: Identifying CD Player Components

	Remove/Install		
1	Open tailgate		
2	Open cover (1) and remove		
3	Loosen butterfly screw (2) for mount (3)		
4	Remove bolts (4).		
5	Pull CD player with changer (in trunk) (A2/6) forward		
6	Disconnect electrical plug (8)		
7	Remove CD player with changer	i **Installation:** Ensure that the vertical installation position is set on the side of the CD player.	
8	Unhook electric lead (5) from retaining clips (6)		
9	Unscrew screws (7) and remove CD player with changer from mount		
10	Install in the reverse order		
11	Perform a function test		

FIBER OPTICAL CABLE (D2B) REPLACE COMPLETE (AFTER TESTING) - AR82.70-P-0005GH

MODEL 163.154 #A as of 145273, 163.154 #X as of 708319, 163.172 #A as of 145273, 163.172 #X as of 708319, 163.113 /128 /157 /174 /175 with CODE (819) 6-disk CD changer

ECE version

MODEL 163.154/172#A as of 221506, 163.157/174/175 with CODE (494a) USA version with CODE (819) 6-disk CD changer

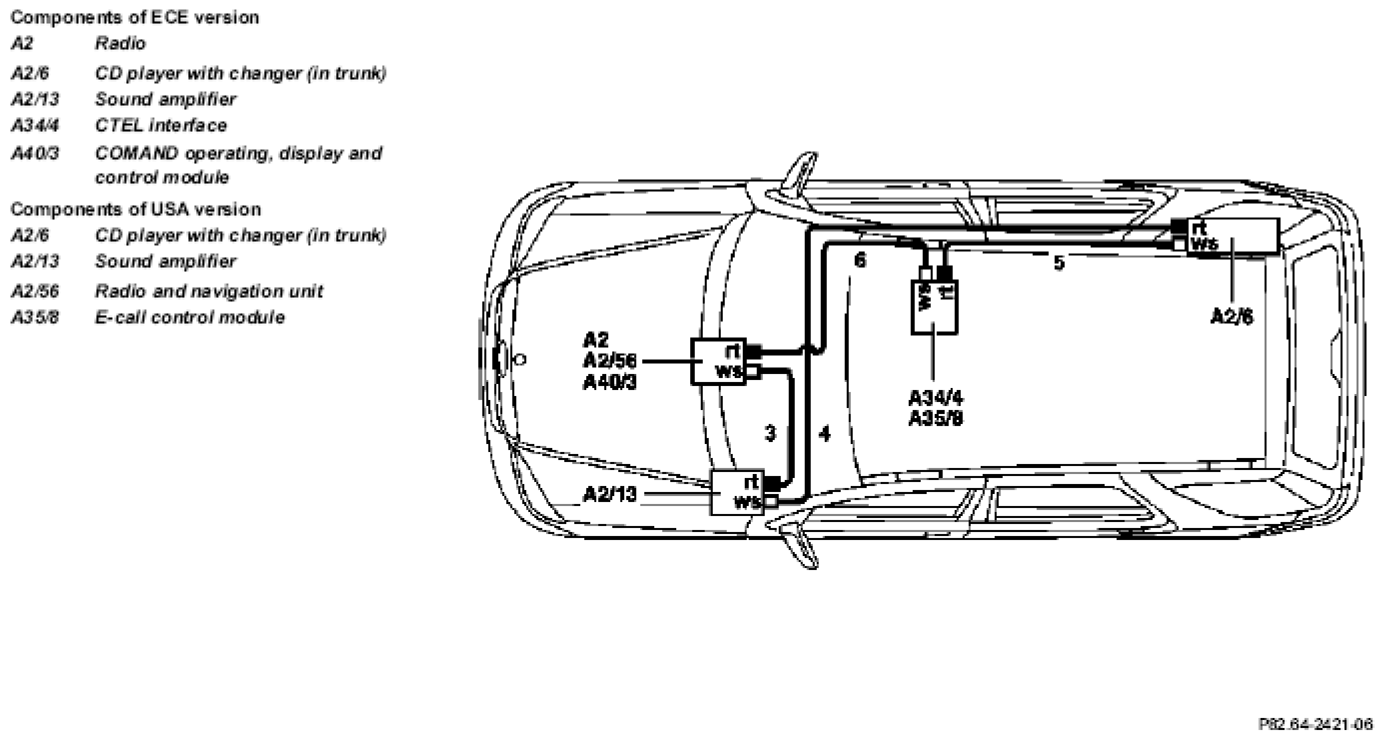
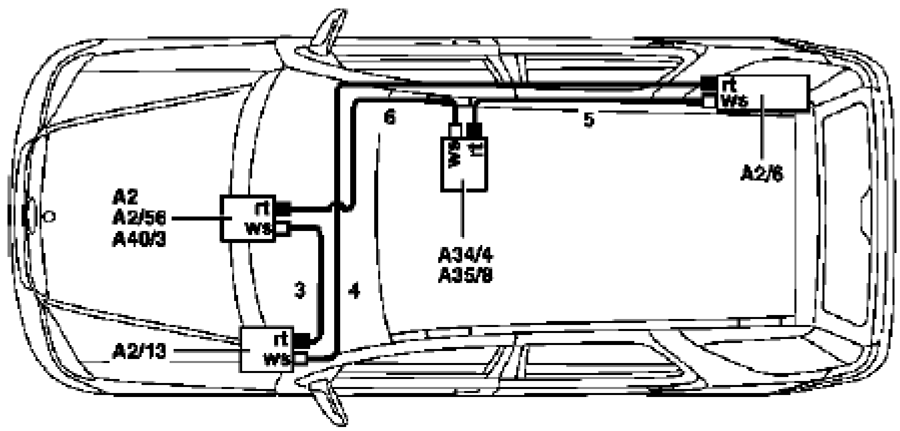


Fig. 207: Identifying Fiber Optical Cable Components

3 Fiber optical cable module 1
4 Fiber optical cable module 2
5 Fiber optical cable module 3
6 Fiber optical cable module 4
rt Insert, red
ws Insert, white

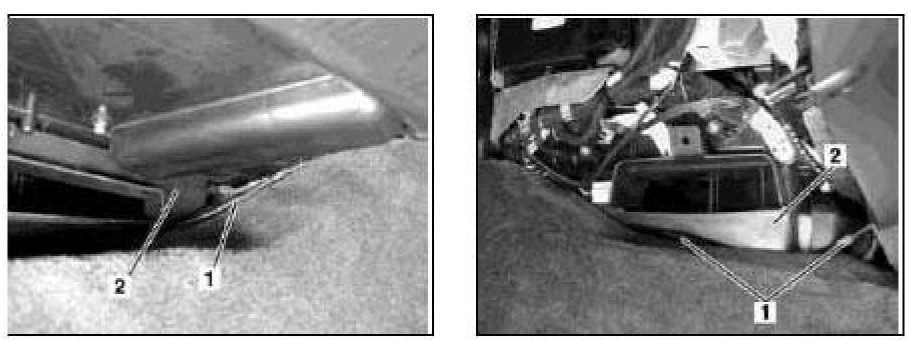


P82.64-2421-06

Fig. 208: Identifying Fiber Optical Cable Components

The cover on the left under the instrument panel removed for a better display

1 Exchange D2 B-wiring harness
2 Heater housing



P82.70-4474-01 P82.70-4475-01

Fig. 209: Identifying Exchange D2 B-Wiring Harness And Heater Housing

	Remove		
	Notes on fiber optic cable	Models 129, 163, 168, 170, 202, 203, 208, 209, 210,215,220,230,463	**AH82.70-P-0001-02A**
1	Remove radio		**AR82.60-P-7502EA**
2	Cut through the existing D2B wiring harness as far as		

	possible from the connector on the radio		
3	Remove cover on right under the instrument panel	[i] Left hand steering vehicle up to 31.8.99. [i] Left hand steering vehicle as of 1.9.99. [i] Right-hand drive vehicle.	**AR68.10-P-1520GH** **AR68.10-P-1520GI** **AR68.10-P-1500GH**
4	Remove right-hand side entrance strip		**AR68.30-P-4100GH**
5	Remove footwell cover on right		**AR68.30-P-4010GH**
6	Unscrew the bolt for the outer rear seat belt on the right side		
7	Remove the front load compartment hooks on the right C-pillar		
8	Remove load compartment cover and unscrew the bolt in the bracket		
9	Remove cover for the CD changer and unscrew bolt behind the cover in the top left corner		
10	Disconnect D2B plug from CD changer and unclip the wiring harness from the bracket		
11	Remove the existing D2B wiring harness between the CD changer and firewall at the transmission tunnel	[i] Cut off the existing D2B wiring harness at the last tie strap between the heater housing and firewall. **Only if the D2B wiring harness is NOT in the interior wiring harness** .	
[X]	**Install**		
12	Plug the plug of the new D2B wiring harness into the CD changer and route the wiring harness along	**Risk of breakage!** Do not kink or stretch fiber optic cable Before routing, push the caps onto the fiber optical cable. [i] Fasten the wiring harness to	**AR82.95-P-0005-01A**

	the feed hose of the liftgate washer system to the front edge of the C-pillar paneling	the CD changer bracket. Pull the C-pillar paneling away from the body for better accessibility.	
13	Route the new D2B wiring harness along the feed hose of the liftgate washer system up to the right A-pillar	i Fasten the D2B wiring harness to the body with inline clips.	
14	Route the new D2B wiring harness along the vehicle wiring harness from the right footwell to the top side of the transmission tunnel to the firewall	i Fasten the D2B wiring harness to the vehicle wiring harness using tie straps.	
15	Route the exchange D2B wiring harness (1) on the carpet, through under the heater housing (2) to the left side		
16	Route exchange D2B wiring harness (1) to the radio installation opening	i D2Fasten the B-wiring harness to the vehicle wiring harness using tie straps.	
17	Screw the screw into the top left corner behind the cover for the CD-changer		
18	Screw the screw into the bracket of the load compartment cover and install the load compartment cover		
19	Install the front load compartment hooks on the right C-pillar		
20	Screw in the screw for the outer rear seat belt on the right-side	Nm	***BA91.40-P-1001-01D**
21	Install right footwell cover		**AR68.30-P-4010GH**
22	Install right door sill molding		**AR68.30-P-4100GH**
23	Install the cover on the		**AR68.10-P-1520GH**

	right under the instrument panel	[i] Left hand steering vehicle up to 31.8.99. [i] Left hand steering vehicle as of 1.9.99. [i] Right-hand drive vehicle.	 **AR68.10-P-1520GI** **AR68.10-P-1500GH**
24	Install radio		**AR82.60-P-7502EA**

[Nm] Seat belts/emergency tensioning retractors

Number	Designation		Model 163 as of 09/99
BA91.40-P-1001-01D	Screw on belt end fitting	Nm	35

FIBER OPTICAL CABLE (D2B) REPLACE COMPLETE (AFTER TESTING) - AR82.70-P-0005GI

MODEL 163.136 #A as of 051500, 163.136 #X as of 708319, 163.154 #A as of 051500, 163.154 #X as of 708319, 163.172 #A as of 051500, 163.172 #X as of 708319, 163.113/128/157/174/175 with CODE (852) CTEL preinstallation assembly at dome with CODE (854) MB portable cellular telephone

ECE-Ausfuhrung

MODEL 163.154 /172 /174 #A as of 221506, 163.157/175 with CODE (349) E Call emergency call system with CODE (494a) USA version

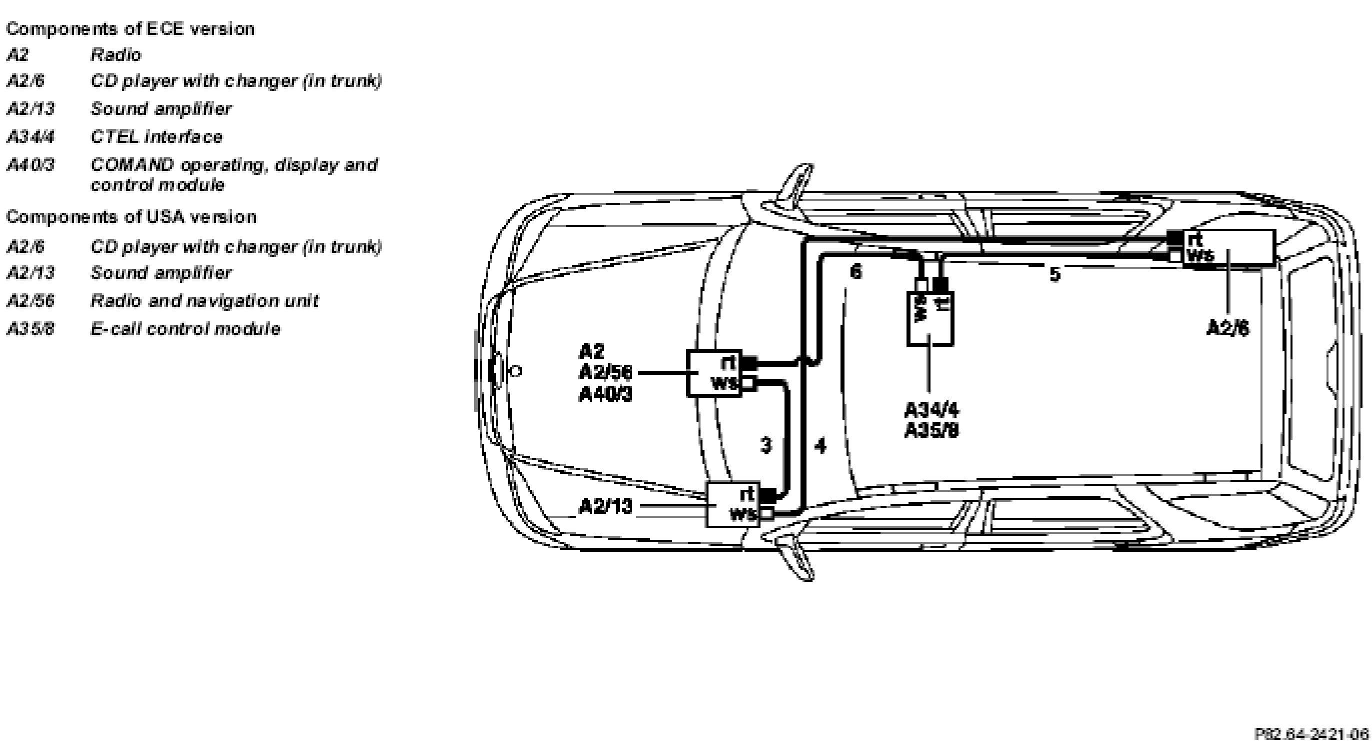
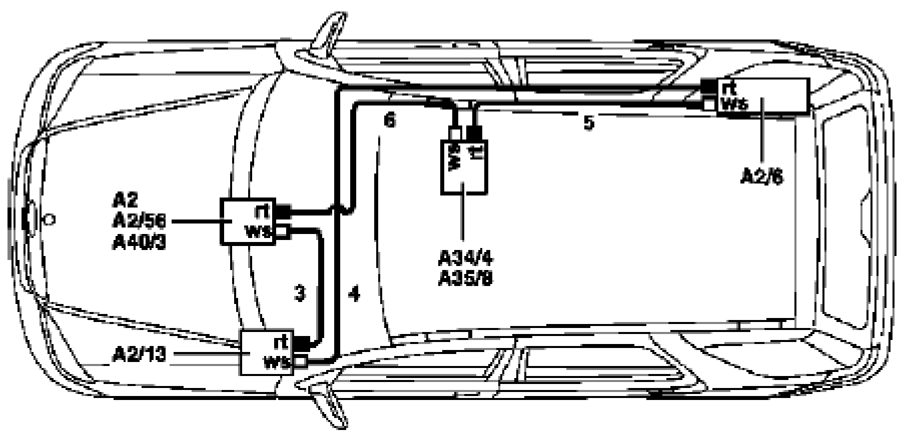


Fig. 210: Identifying Fiber Optical Cable Components

3 Fiber optic cable module 1
4 Fiber optic cable module 2
5 Fiber optic cable module 3
6 Fiber optic cable module 4
rt Insert, red
ws Insert, white

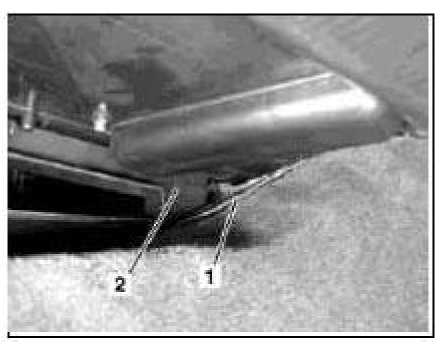


P82.64-2421-06

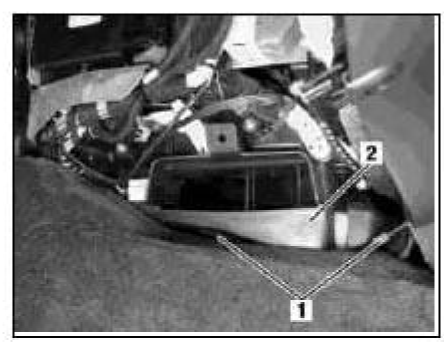
Fig. 211: Identifying Fiber Optical Cable Components

Cover on left under the instrument panel removed for a better display

1 Exchange D2 B-wiring harness
2 Heater housing



P82.70-4474-01



P82.70-4475-01

Fig. 212: Identifying Exchange D2 B-Wiring Harness And Heater Housing

	Remove		
	Notes on fiber optic cable	Models 129,163, 168, 170, 202, 203, 208, 209, 210,215,220,230,463	**AH82.70-P-0001-02A**
1	Remove radio		**AR82.60-P-7502EA**
2	Cut the existing D2B wiring harness as far as possible away from the		

	connector to the radio		
3	Remove cover on right under the instrument panel	[i] Left hand steering vehicle up to 31.8.99. [i] Left hand steering vehicle as of 1.9.99. [i] Right-hand drive vehicle.	**AR68.10-P-1520GH** **AR68.10-P-1520GI** **AR68.10-P-1500GH**
4	Remove right-hand side entrance strip		**AR68.30-P-4100GH**
5	Remove footwell cover on right		**AR68.30-P-4010GH**
6.1	Remove E-Call control module (A35/8)		**AR82.95-P-0008GH**
6.2	Remove CTEL [TEL] interface (A34/4)		
7	Disconnect D2B plug from E-Call control module (A35/8) or CTEL [TEL] interface (A34/4)	[i] E-call control module: with USA version, code 494a. CTEL [TEL] interface: ECE version	
8	Remove air duct behind the E-Call control module (A35/8) or CTEL [TEL] interface (A34/4)		
9	Remove the existing D2B wiring harness between the E-call control module (A35/8) or CTEL [TEL] interface (A34/4) and firewall at the transmission tunnel	[i] Cut off the existing D2B wiring harness at the last tie strap between the heater housing (2) and firewall.	
	Install		
10	Plug the plug from the exchange D2B wiring harness (1) into the E-call control module (A35/8) or CTEL [TEL] interface (A34/4) and route the wiring harness under the carpet to the right A-pillar	**Risk of breakage!** Do not kink or stretch fiber optic cable Before routing, install the caps on the fiber optical cable. [i] Fasten D2B wiring harness to the body using existing clips.	**AR82.95-P-0005-01A**

11	Route exchange D2B wiring harness (1) along the existing wiring harness from the right footwell to the top side of the transmission tunnel at the firewall	[i] Fasten D2B wiring harness to the vehicle harness using tie straps.	
12	Route the exchange D2B wiring harness (1) on the carpet through under the heater housing (2) to the left side		
13	Route exchange D2B wiring harness (1) up to the radio installation opening	[i] Fasten D2B wiring harness to the vehicle harness using tie straps.	
14	Install air duct behind the E-call control module (A35/8) or CTEL [TEL] interface (A34/4)		
15	Plug the D2B plug into the E-call control module (A35/8) or CTEL [TEL] interface (A34/4)	[i] E-call control module: with USA version, code 494a. CTEL [TEL] interface: ECE version	
16.1	Install CTEL [TEL] interface (A34/4)	Nm Nm	***BA91.10-P-1001-01B** ***BA91.40-P-1001-01D**
16.2	Install E-call control module (A35/8)	 Nm Nm	**AR82.95-P-0008GH** ***BA91.10-P-1001-01B** ***BA91.40-P-1001-01D**
17	Install right footwell cover		**AR68.30-P-4010GH**
18	Install right door sill molding		**AR68.30-P-4100GH**
19	Install the cover on the right under the instrument panel	[i] Left hand steering vehicle up to 31.8.99.	**AR68.10-P-1520GH**

		i Left hand steering vehicle as of 1.9.99. i Right-hand drive vehicle.	**AR68.10-P-1520GI** **AR68.10-P-1500GH**
20	Plug D2B plug from exchange D2B wiring harness (1) into radio		
21	Install radio		**AR82.60-P-7502EA**

Front seats

Number	Designation	Model Series 163
BA91.10-P-1001-01B	Bolt of seating mounting bracket to vehicle floor Nm	40

Seat belts/emergency tensioning retractors

Number	Designation	Model 163 up to 08/99	Model 163 as of 09/99
BA91.40-P-1001-01D	Screw on belt end fitting Nm	35	35

FIBER OPTICAL CABLE (D2B) REPLACE COMPLETE (AFTER TESTING) - AR82.70-P-0005GJ

MODEL 163.113 /154 /174 #A as of 289565, 163.113 #X as of 754620, 163.128 /157 /175 with CODE (810) Sound system

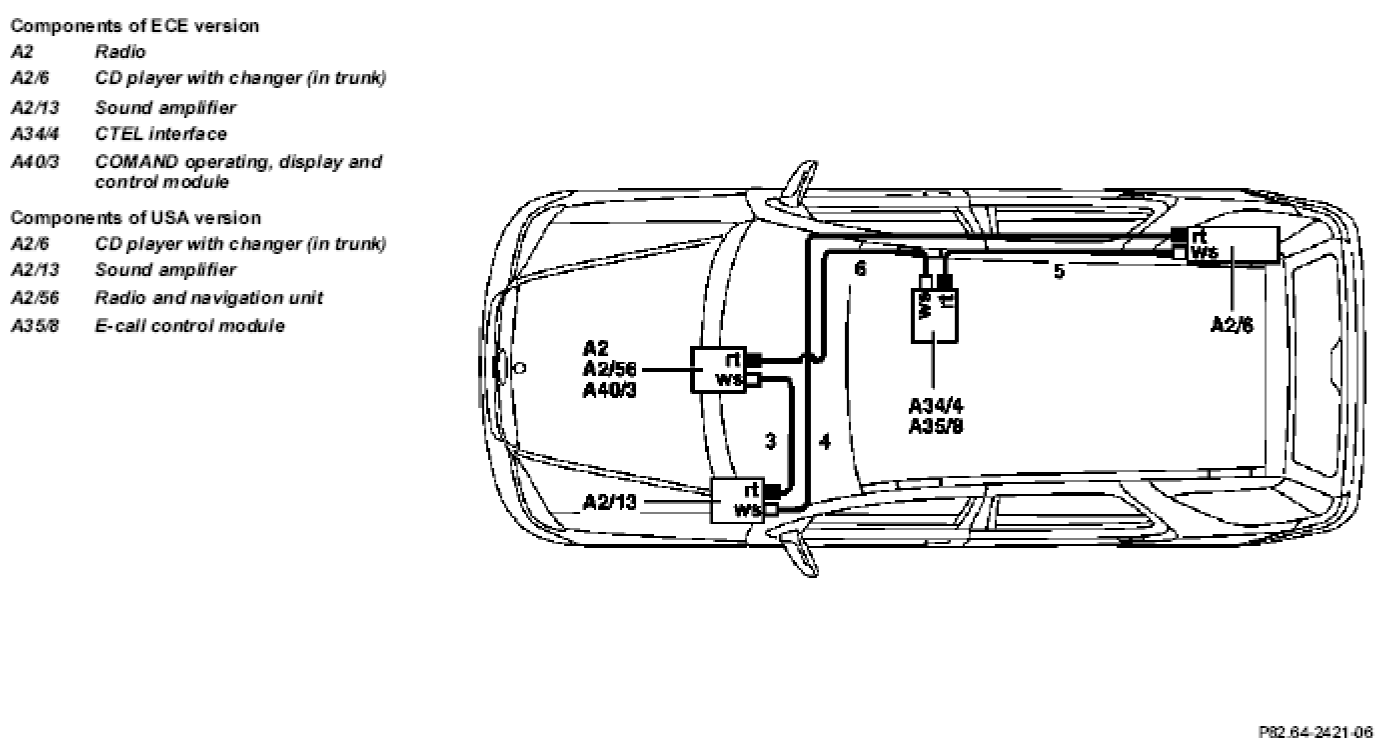


Fig. 213: Identifying Fiber Optical Cable (D2B) Components

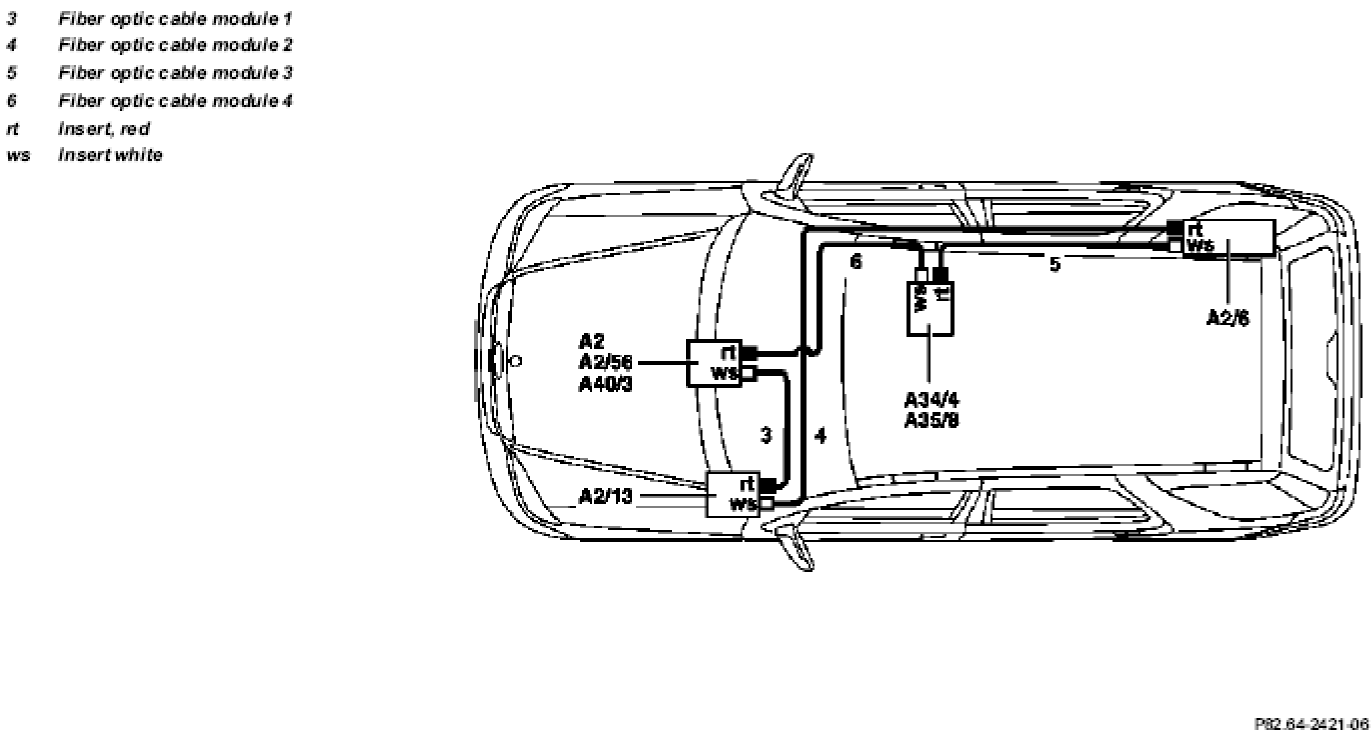


Fig. 214: Identifying Fiber Optical Cable (D2B) Components



Fig. 215: Identifying Exchange D2B Wiring Harness And Heater Housing

	Remove		
	Notes on fiber optic cable	Models 129, 163, 168, 170, 202, 203, 208, 209, 210,215,220,230,463	**AH82.70-P-0001-02A**
1	Remove radio		**AR82.60-P-7502EA**
2	Cut through the existing D2B wiring harness as far as possible from the connector on		

	the radio		
3	Remove cover under instrument panel on driver's side		**AR68.10-P-1500GH**
4	Unscrew screw on Sound amplifier (A2/13) and disconnect D2 B-plug		
5	Cut the existing D2B wiring harness as far as possible away from the plug for the sound amplifier		
	Install		
6	Plug the plug of the exchange D2B wiring harness into the sound amplifier (A2/13)		
7	Fasten sound amplifier (A2/13) with screw		
8	Route exchange D2B wiring harness (1) along existing wiring harness to the center of the instrument panel	**Danger of breaking!** Do not kink or stretch fiber optic cable Before routing, push the caps onto the plugs.	**AR82.95-P-0005-01A**
9	Route exchange D2B wiring harness (1) next to the heater housing (2) downwards and behind the bracket of the control module for automatic transmission/connector for interior wiring harness	i Ensure that the D2B wiring harness does not cross other lines/wiring harnesses. Fasten existing D2B wiring harness to existing wiring harness using tie straps.	
10	Route exchange D2B wiring harness (1) upwards to the radio installation opening	i Fasten D2B wiring harness to existing wiring harness using tie straps.	
11	Install cover under the instrument panel on the driver's side		**AR68.10-P-1500GH**
12	Plug the plug of the exchange D2B wiring harness (1) into the radio		
13	Install radio		**AR82.60-P-7502EA**

REMOVE/INSTALL ANTENNA SPLITTER - AR82.70-P-8953GH

MODEL 163.113 /136 /154 /157 /172 /174

1 Bolt
2 Bolt
3 Electrical connections
A2/5 Radio antenna splitter

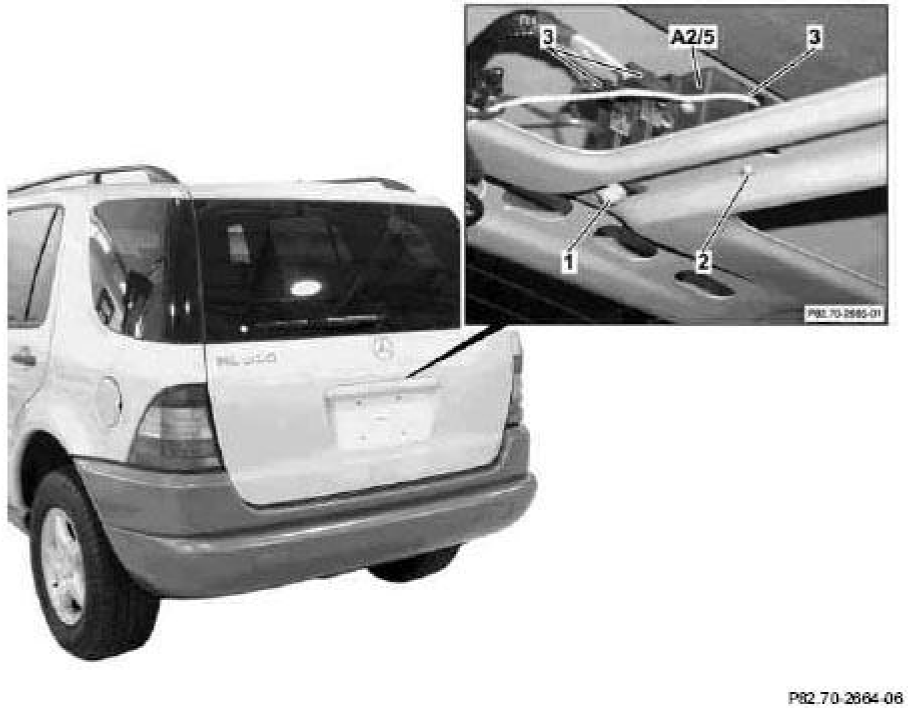


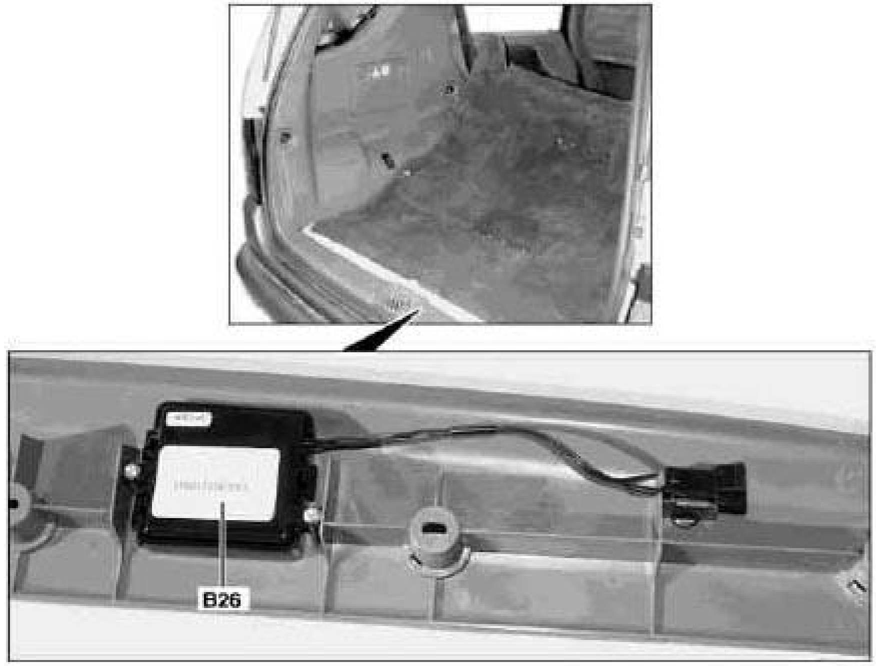
Fig. 216: Identifying Antenna Splitter Components

	Remove/install		
	Information on preventing damage to electronic components due to electrostatic discharge		**AH54.00-P-0001-01A**
1	Open rear-end door		
2	Remove liner on tailgate		**AR72.20-P-3520GH**
3	Remove bolts (1, 2)		
4	Disconnect electrical connectors (3)		
5	Remove radio antenna splitter (A2/5)		
6	Install in the reverse order		

REMOVE/INSTALL ELECTRONIC COMPASS - AR82.85-P-7371GH

MODELS 163.113 /154 /172 /174 #A as of 221506, 163.113 #X as of 734088, 163.128 /157 /175 with CODE (245) Trip computer

B26 Electronic compass



P54.50-2035-06

Fig. 217: Identifying Electronic Compass

	Remove/Install		
1	Remove door sill molding in load compartment		**AR68.30-P-4100GI**
2	Remove electronic compass (B26)		
3	Install in the reverse order		
4.1	Calibrate compass and perform zone adjustment	i Only when the compass is replaced.	
SI	Service Information: Compass in trip computer		SI54.50-P-0001A

COVER FIBER OPTIC CABLE - AR82.95-P-0005-01A

Do not remove protective covers too early from the fiber optic cable coupling (3) or the device connection (4) because contaminated or scratched surfaces may absorb the light. Fiber optic cables must not be kinked, routed over sharp edges or bent in radii of less than 25 mm, otherwise the fiber optic cable core will be yellowed and broken. Yellowed or broken fiber optic cables weaken the light.

i The work procedure is shown on components of the digital data bus (D2B).

1. Carefully detach the fiber optic cable coupling (3) from the device connection (4) and cover it with a protective cap (1), stop plug (2) or a clean rag.

i The protective cap (1) and stop plug (2) for the digital data bus (D2B) components are not separately available. The protective caps (1) and plugs (2) of installed replacement parts must be used. The components of the Media Oriented System Transport (MOST) must be covered up with clean rags, as generally they are not fitted with protective caps (1) and plugs (2).

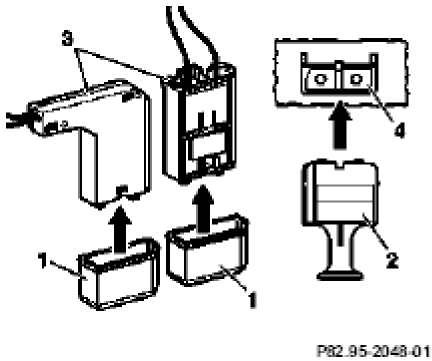


Fig. 218: Covering Fiber Optic Cable Coupling And Device Connection With Protective Cap

REMOVE/INSTALL CONTROL MODULE FOR E-CALL EMERGENCY CALL SYSTEM - AR82.95-P-0008GH

MODELS 163.113 /128 /154 /157 /172 /174 /175 with CODE (349) E Call emergency call system with CODE (460) Additional parts Canadian vehicles with CODE (494a) USA version

1	*Right front seat*
2	*Connector*
3	*Conductive coupling D2B*
4	*Antenna plug*
5	*Bolts*
A35/8	*E-call control module*



Fig. 219: Identifying E-Call Control Module Components

	Remove/install		

1	Remove fuse f8 from fuse and relay module		
2	Unscrew screws on front seat console	Nm	***BA91.10-P-1001-01B**
3	Angle front seat back until it rests against the rear bench seat and fasten with outer seat belt	Remove wiring harness for E-call speaker from E-call bracket. Cover the floor covering behind the front seat to avoid contamination.	
4	Detach connector (2) and antenna plug (4) from the E-call control module (A35/8)		
5	Detach conductive coupling D2B (3)	Do not kink or stretch fiber optic cable. Press protective caps on conductive coupling and device connection.	**AR82.95-P-0005-01A**
6	Unscrew screws (5)		
7	Remove E-call control module (A35/8)		
8	Install in the reverse order		

Nm Front seats

Number	Designation		Model Series 163
BA91.10-P-1001-01B	Bolt of seating mounting bracket to vehicle floor	Nm	40

REPLACE FIBER OPTICAL CABLE (D2B) BETWEEN THE RADIO AND E-CALL CONTROL MODULE/CTEL [TEL] INTERFACE (AFTER TESTING) - AR82.95-P-0015GH

MODEL 163.136 #A as of 051500, 163.136 #X as of 708319, 163.154 #A as of 051500, 163.154 #X as of 708319, 163.172 #A as of 051500, 163.172 #X as of 708319, 163.113/128/157/174/175 with CODE (852) CTEL preinstallation assembly at dome with CODE (854) MB portable cellular telephone

MODEL 163.154 /172 /174 #A as of 221506, 163.157/175 with CODE (349) E Call emergency call system with CODE (494a) USA version

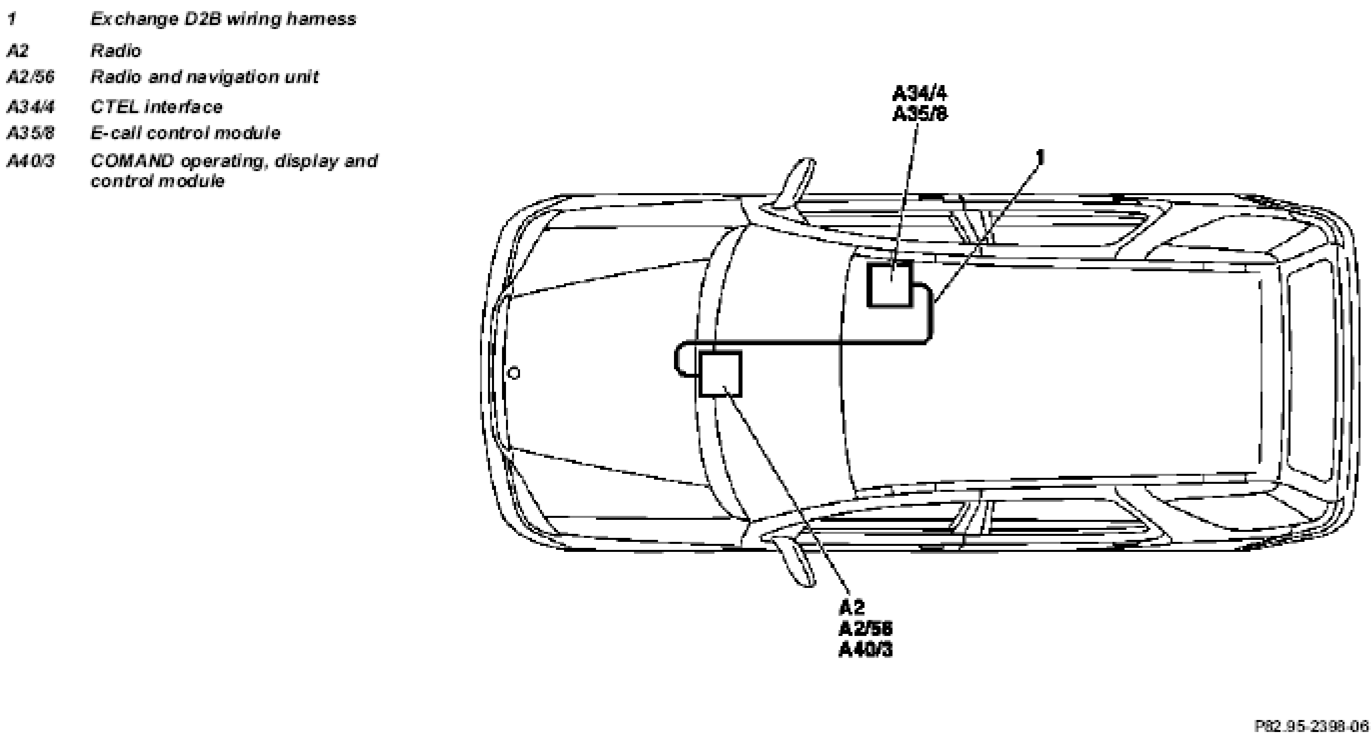


Fig. 220: Identifying CTEL Interface, Radio And Navigation Unit And Exchange D2B Wiring Harness

	Remove		
	Notes on fiber optic cable	Models 129, 163, 168, 170, 202, 203, 208, 209, 210,215,220,230,463	**AH82.70-P-0001-02A**
GF	Fiber optic cable, location	MODEL Series 163	**GF82.00-P-4000-01GH**
1	Remove radio (A2)		**AR82.60-P-7502EA**
2	Remove center console		**AR68.20-P-2000GH**
3.1	Remove E-call control module (A35/8) with bracket	Only with E-Call emergency call system, code 349. Do not take the control module out of the bracket.	**AR82.95-P-0008GH**
3.2	Remove CTEL [TEL] interface (A34/4) with bracket	Only with complete portable CTEL preinstallation on dome code 852 or with MB portable CTEL, code 854. Do not take control module out of the bracket.	
	Install		
4	Pull white insert of the D2B wiring harness out of the D2B plug on the	**Risk of breakage!** Do not kink or stretch fiber optic cable **USA version only:** when the	AR82.70-P-0004-01A

	E-call control module/ CTEL [TEL] interface and replace with the white insert of the exchange D2B wiring harness	voice control system (SBS) is installed, the white D2B insert should be removed from the voice control system control module and not from the E-call control module/CTEL [TEL] interface. ⓘ Pay attention to the correct installation position of the insert in the D2B plug. Cut off the fiber optical cable removed at the adhesive tape.	
5	Route exchange D2B wiring harness (1) under the floor covering to the transmission tunnel		
6	Route exchange D2B wiring harness (1) at the top of the transmission tunnel to the center part of the instrument panel	ⓘ Route fiber optical cable under the air duct. Guide it past all components on the left side.	
7	Route exchange D2B wiring harness (1) behind the instrument panel to the radio installation opening		
8	Remove red insert of the D2B wiring harness from the D2B plug on the radio and replace with the red insert of the exchange D2B wiring harness	**Risk of breakage!** Do not kink or stretch fiber optic cable ⓘ Pay attention to the correct installation position of the insert in the D2 B-plug. Cut off the fiber optical cable removed at the adhesive tape.	AR82.70-P-0004-01A
9	Fasten exchange D2B wiring harness (1) to the existing D2B wiring harness of the radio		
10.1	Install CTEL [TEL] interface (A34/4) with bracket	ⓘ Only with complete portable CTEL-preinstallation on dome, code 852 or with MB portable CTEL, code 854. Nm Nm	 ***BA91.10-P-1001-01B** ***BA91.40-P-1001-01D**

10.2	Install E-call control module (A35/8) with bracket	[i] Only with emergency call system E-Call, code 349. Nm Nm	**AR82.95-P-0008GH** ***BA91.10-P-1001-01B** ***BA91.40-P-1001-01D**
11	Install center console		**AR68.20-P-2000GH**
12	Install radio (A2)		**AR82.60-P-7502EA**

Nm Front seats

Number	Designation		Model Series 163
BA91.10-P-1001-01B	Bolt of seating mounting bracket to vehicle floor	Nm	40

Nm Seat belts/emergency tensioning retractors

Number	Designation		Model 163 up to 08/99	Model 163 as of 09/99
BA91.40-P-1001-01D	Screw on belt end fitting	Nm	35	35

MAINTENANCE

CHECK SETTING OF HIGH BEAM - AP82.10-P-8260-02A

1. The light focal point should be located on the relevant central mark (6). In the event of a deviation: Check seat of bulb.

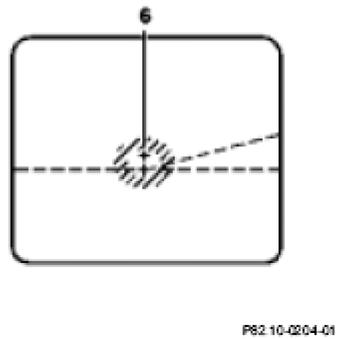


Fig. 221: Identifying Central Mark

SET OR INSPECT FOG LAMPS - AP82.10-P-8260-04A

1. The light-dark boundary must be as horizontal as possible at the height of the appropriate dividing line (4), correct if necessary.
2. For model 140 sedan as of approx. 03.94, 168 and 202: Check seat of bulb.

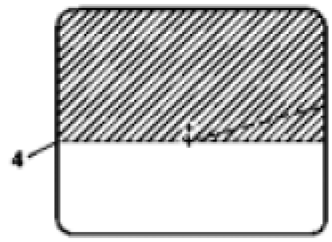


Fig. 222: Identifying Dividing Line

Model 163.113 /154#A as of 289565, 163.113 #X as of 754620, 163.128 /154 /157 /175 except CODE (U49) Styling package

Arrow: Position of adjusting screw



Fig. 223: Locating Adjusting Screw Position

CHECK AND CORRECT HEADLAMP ADJUSTMENT - AP82.10-P-8260GH

MODEL 163

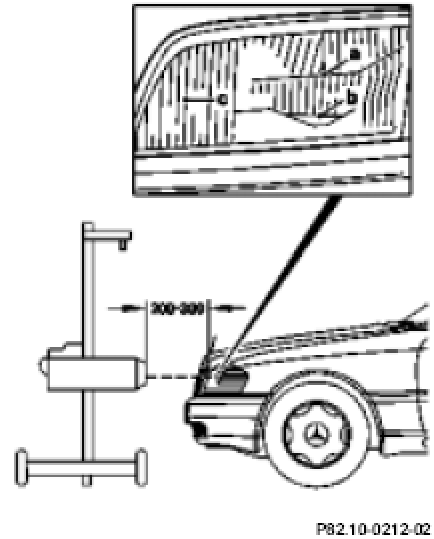


Fig. 224: Checking Headlamp Adjustment

	Check		
1	Drive vehicle to level surface	The vehicle level must not change when the brakes are applied. Vehicle must be in ready-for-the-road condition (unladen weight, fuel tank full or proper additional weight). Correctly adjust tire pressure. Load driver's seat with 75 kg or a person (except USA)	
2	Align headlamp adjustment tester to vehicle and adjust height according to marking in lens	i Follow the operating instructions for headlamp beam setting equipment exactly	***WE58.40-Z-1006-19A**
Danger!	**Risk of accident** from vehicle starting off by itself when engine running. **Risk of injury** suffered in the form of bruises or burns to the hands when reaching in while the engine cranks or runs	Secure vehicle to prevent it from moving off by itself. Wear closed and close-fitting work clothes. Do not touch hot or rotating parts.	**AS00.00-Z-0005-01A**

3	Run engine and switch on low beam		
4	Check headlamp range control for proper function	(except USA) i The light beams from both headlamps should change uniformly	
5	Set headlamp range control switch to position 0		
6	Check low beams	Adjust if necessary (except USA) i Due to the common reflector unit, the low beams, high beams and fog lamps are adjusted simultaneously. US version: ? See "Owner's Manual"	AP82.10-P-8260-01A
7	Check high beam adjustment		**AP82.10-P-8260-02A**
8	Check fog lamps		**AP82.10-P-8260-04A**

Workshop equipment

WE58.40-Z-1006-19A	Headlamp adjustment testing unit

WINDSHIELD WASHER - CHECKING AND CORRECTING FLUID LEVEL - AP82.35-P-8210GH

MODEL 163

Windshield washer fluid reservoir

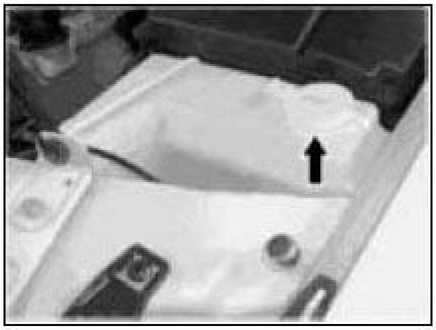

P82.35-0251-01

Fig. 225: Locating Windshield Washer Fluid Reservoir

	Checking		
1	Check fluid level in windshield washer fluid reservoir and adjust to correct level	i See table on packaging for mixing ratio MB windshield washer fluid concentrate conforming to Specifications for Service Products sheet 371.	

WINDSHIELD WIPERS, WINDSHIELD WASHER SYSTEM - OPERATIONAL INSPECTION - AP82.35-P-8252GH

MODEL 163

Modification notes

12.1.05	Check wiper blades, deleted	Step 2	

	Check		
1	Check operation of spray nozzles	i Use a suitable needle to clean blocked spray nozzles from the outside	
2	Check setting of wiper arms	i The end of the wiper arm must be parallel with the windshield. If necessary correct the stagger of the wiper arm accordingly.	

RETROFITTING & CONVERSION

RETROFITTING WIRING HARNESS - AN82.61-P-0001-01H

Model 163 with automatic transmission

1. Prepare adapter wiring harness (4) as shown in figure.

4	Adapter wiring harness
7	Radio mating connector
8	CAN bus adapter connector
A2/29	Radio and navigation operating unit
C	Black 10-pin connector
Y	Telephone connector (not required)
or	Green back-up lamp lead

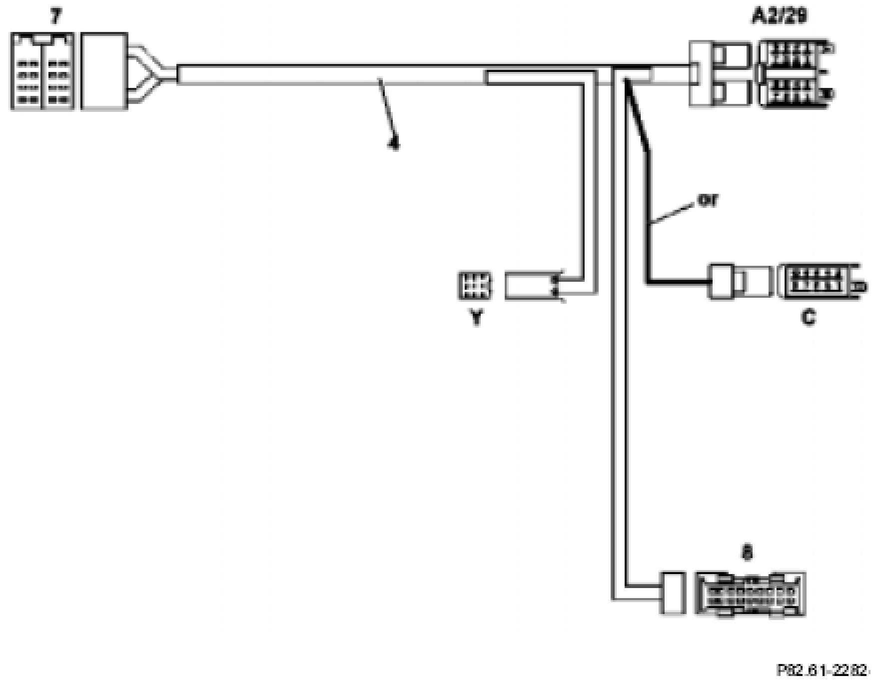


Fig. 226: Identifying Retrofitting Wiring Harness - Prepare Adapter Wiring Harness

2. Route wiring harness (4) along existing leads in vehicle as shown in figure.

4	Adapter wiring harness
5	CAN bus adapter
A2/29	Radio and navigation operating unit
A2/57	GPS/telephone antenna splitter

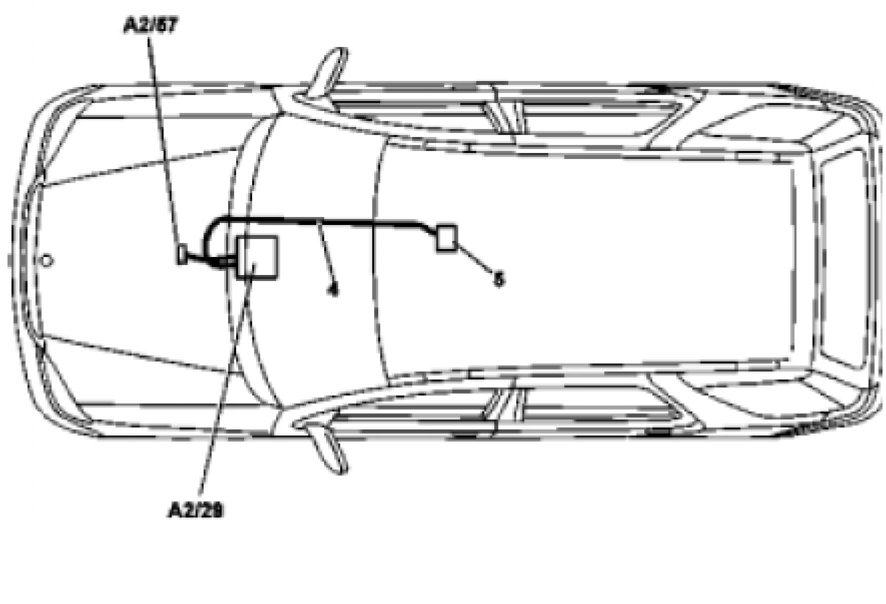
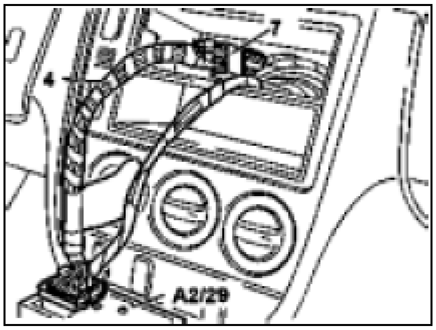


Fig. 227: Identifying Retrofitting Wiring Harness - Route Wiring Harness Along Existing Leads In Vehicle

3. Connect adapter wiring harness (4) to standard wiring harness and radio and navigation operating unit (A2/29) with radio mating connector (7).

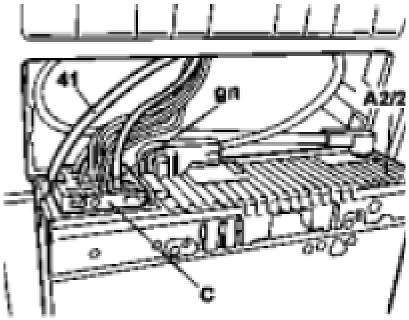


P82.61-2283-01

Fig. 228: Identifying Adapter Wiring Harness, Radio And Navigation Operating Unit And Radio Mating Connector

4. Connect black 10-pin connector (C) to radio and navigation operating unit (A2/29).
5. Connect GPS antenna lead (41) as shown in figure.

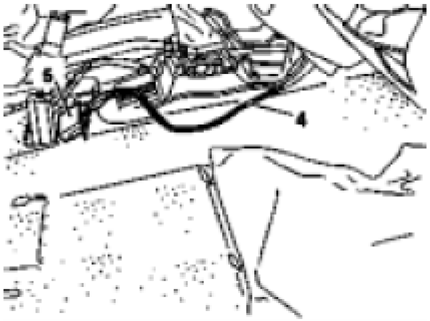
gn	Green back-up lamp signal lead



P82.61-2287

Fig. 229: Identifying 10-Pin Connector, Radio And Navigation Operating Unit, GPS Antenna Lead And Green Back-Up Lamp Signal Lead

6. Route tie-out to CAN bus adapter (5) from adapter wiring harness (5) to center tunnel at rear.



P82.61-2284-01

Fig. 230: Identifying CAN Bus Adapter And Adapter Wiring Harness

7. Position CAN bus adapter mount on strut of center console and mark hole pattern (arrows) as shown in figure.
8. Drill 6.2 mm dia. mounting holes.

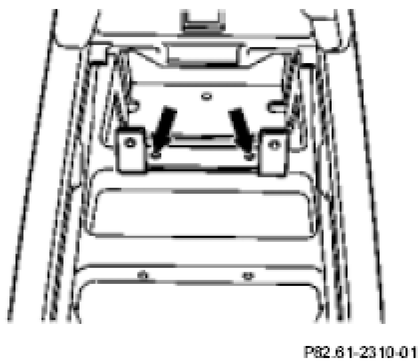


Fig. 231: Locating Hole Pattern

9. Fasten CAN bus adapter (5) with self-tapping screws from CAN bus adapter parts kit.

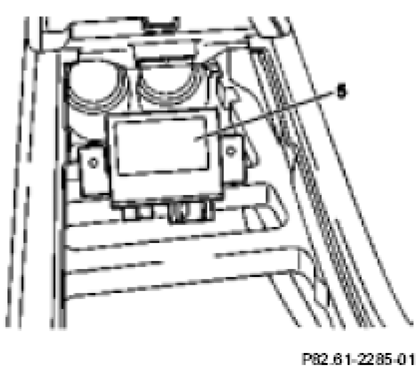


Fig. 232: Identifying CAN Bus Adapter

10. Install white (ws) and blue (bl) fuse on transfer case control module (N78) from CAN bus wiring harness (9) as shown in figure.

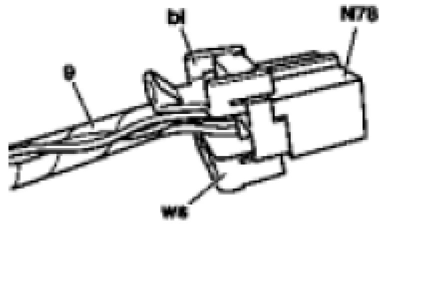


Fig. 233: Identifying Transfer Case Control Module, CAN Bus Wiring Harness And Fuse

11. Disconnect connector from transfer case control module (N78) and connect CAN bus wiring harness (9) between transfer case control module (N78) and standard wiring harness.

    i Illustration without center console.

12. Connect CAN connector (6) from CAN bus wiring harness (9) to CAN bus adapter (5).

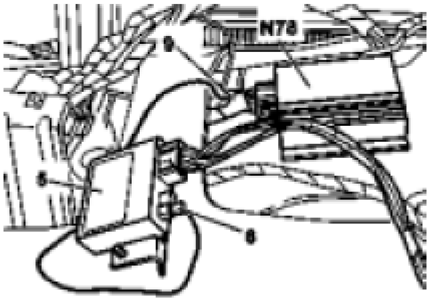


Fig. 234: Identifying Transfer Case Control Module, CAN Bus Adapter And CAN Connector

RETROFITTING DIAGNOSTIC CABLE - AN82.61-P-0001-03A

Model 163

1. Route green (gn) wire from radio shaft to data link connector (X11/4) according to figure and fasten with cable straps.

   i Cut off excessive length at data link connector.

2. Install contact spring on end of green (gn) wire in radio shaft and insert into chamber 2 of connector A for radio and navigation operating unit (A2/29) standard wiring harness.
3. Open data link connector (X11/4) and expose chamber 12.
4. Install contact spring on end of green (gn) lead on data link connector (X11/4) and insert into chamber 12 of data link connector (X11/4).

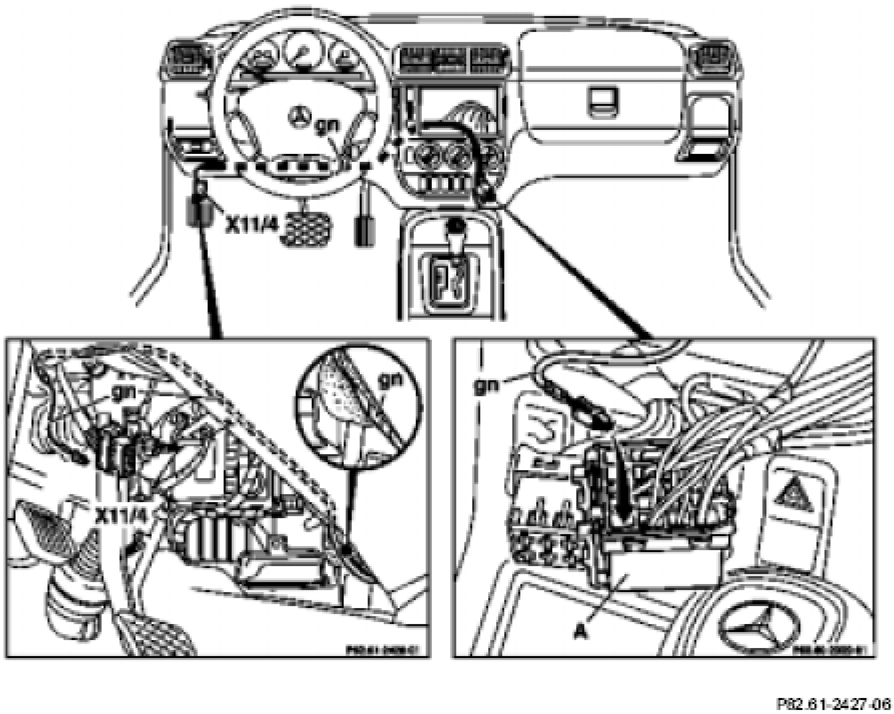


Fig. 235: Identifying Retrofitting Diagnostic Cable

i If a lead is already present in chamber 12 connect it to the green (gn) lead using a solder connector.

RETROFIT NAVIGATION SYSTEM AUDIO 30 APS - AN82.61-P-0001H

MODEL 163 up to 30.6.99 except CODE (819) 6-disk CD changer in trunk

MODEL 163 as of 1.7.99 in combination with CD changer with D2B fiber optic cable system

System illustration with GPS and telephone roof antenna

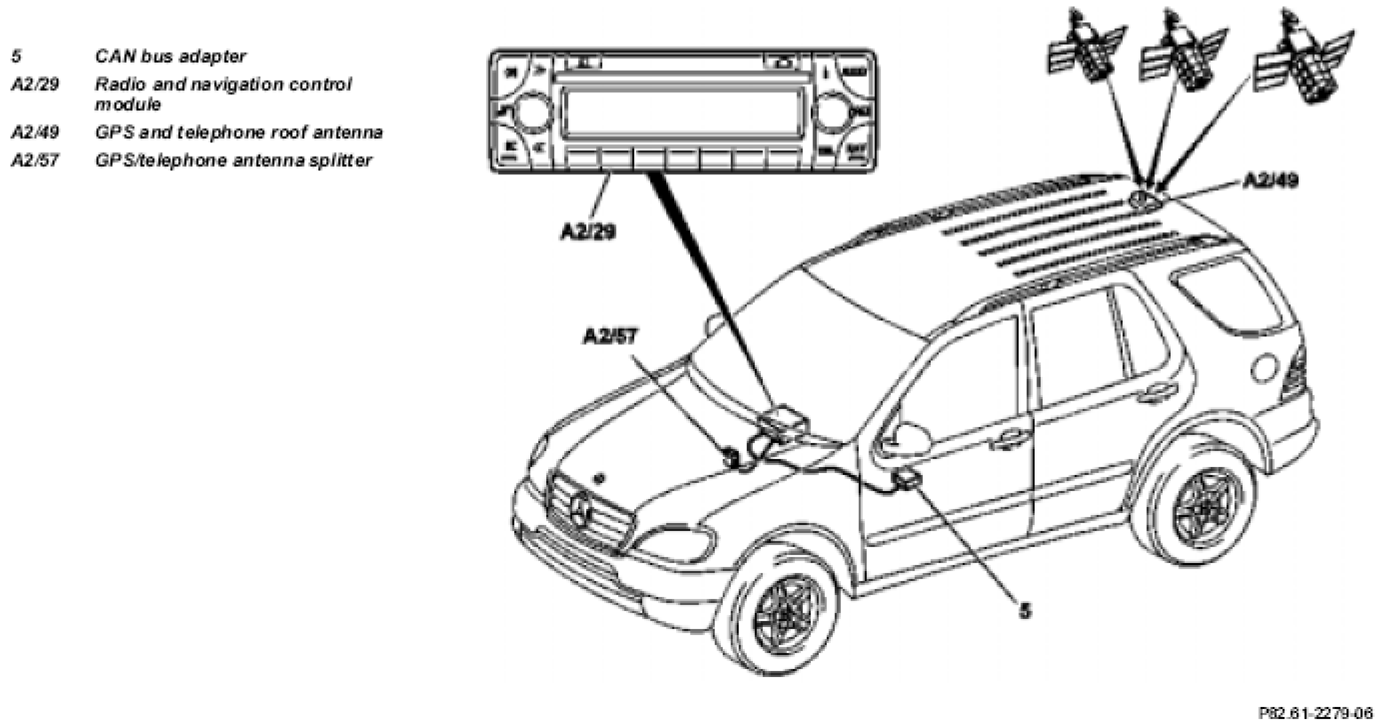


Fig. 236: Identifying Retrofit Navigation System Audio 30 APS Components

i	Notes on assignment for radio connector	Model 163	**AH82.61-P-0001-05A**
i	Notes on telephone operation with Audio 30 APS navigation system	Model 129, 163, 168, 170, 202, 208, 210	**AH82.61-P-0001-06A**
	Removal		
1 AR	Disconnect ground cable of battery		**AR54.10-P-0003A**
2 AR	Remove radio	i The Audio 30 APS radio is installed.	**AR82.60-P-7502EA**
3 AR	Remove center console		**AR68.20-P-2000GH**
4 AR	Remove cover below instrument panel on left	i On vehicles up to 06/99	**AR68.10-P-1500GH**
5	Remove diagnostic socket	i On vehicles up to 06/99	
	Install		
6	Retrofit global position		**AN82.61-P-7474-04AZ**

	system antenna (GPS) on roof		
7	Install adapter wiring harness	i for vehicles with engine 111 or up to 06/99 Vehicles with automatic transmission Vehicles with manual transmission	 **AN82.61-P-0001-01H** AN82.61-P-0001-01I
8	Retrofit diagnostic line	i On vehicles up to 06/99	**AN82.61-P-0001-03A**
9	Reassemble vehicle 5 to 1		
10	Enable equipment code	i See operating instructions	
11	Start up auto-pilot system	i On vehicles with sound system active sound system when performing diagnosis.	**AN82.61-P-1002-07B** ***WH58.30-Z-1036-13A**

Commercially available tools

Number	Designation	
WH58.30-Z-1036-13A	Handheld tester (HHT)	651 100 01 99

Parts ordering notes

Part no.	Description	Quantity
B6 782 25 51	Audio 30 APS radio	1
KG82 (see EPC)	GPS and telephone antenna	1
KG82 (see EPC)	Antenna lead from splitter to radio	1
KG82 (see EPC)	Adapter wiring harness (without sound system) (vehicles with M111 or up to 06.99)	1
KG82 (see EPC)	CAN bus wiring harness (vehicles with M 111 or up to 06.99)	1
KG82 (see EPC)	CAN bus adapter (vehicles with M 111 or up to 06.99)	1
KG82 (see EPC)	Adapter wiring harness (with sound system) (vehicles with M 111 or up to 06.99)	1
A011 545 80 26	Contact spring (radio) (on vehicles up to 06.99)	2
commercially available	green 0.5 mm lead^2	2M
commercially available	green 0.5 mm lead ^{2} (diagnostic lead) (on vehicles up to 06.99)	2M
A012 545 39 26	Contact spring (diagnostic socket)	1

	(on vehicles up to 06.99)	
KG82 (see EPC)	Antenna splitter	1

CALIBRATION OF AUTO-PILOT SYSTEM - AN82.61-P-1002-07B

Models 129, 140, 163, 168, 170, 202, 208, 210,220

System description

ⓘ Start-up step 6 applies only for units which have already been installed in a vehicle and initially calibrated.

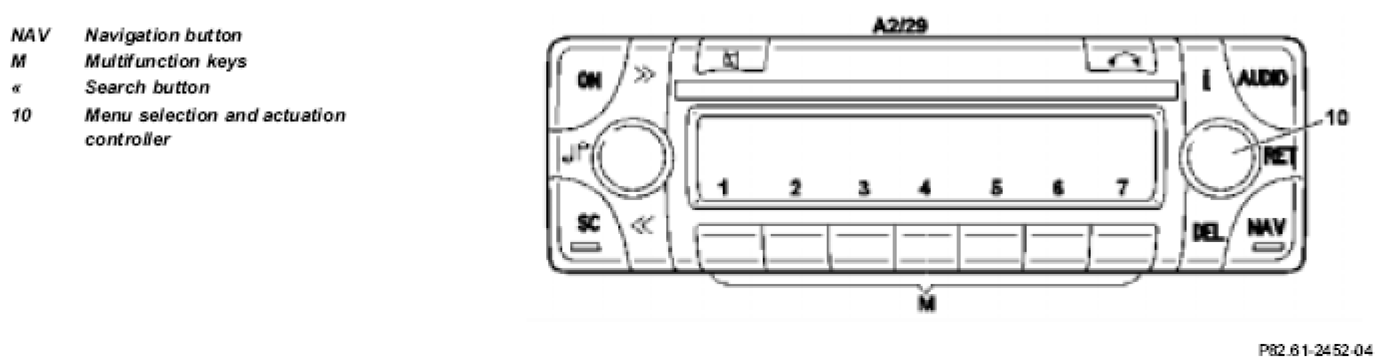


Fig. 237: Identifying Auto-Pilot System

ⓘ Vehicles as of 7/99 can be operated only with an Audio 30 APS radio with part number 208 820 XX XX. Units with part number 168 820 XX XX are not capable of communicating with the steering wheel control.

On vehicles as of 7/99 it is necessary to release the auto-pilot system Audio 30 APS with the diagnosis feature.

Units with navigation CD **"Audio 30 APS 3.0"** can be started up with accelerated calibration on vehicles as of 1998 (see "Accelerated Start-Up").

	Start-up step	Action on keypad	Feedback on display
	Accelerated start-up		
1	Start engine		
2	Switch on Audio 30 APS with ON button	Enter code (see CODE card) with the multifunction keys below the numbers in the display field and confirm with "search key".	**CODE 1 2 3 4 5 6 7 8**
3	Insert update CD (only on new units delivered with an update CD)	Follow menu guidance	
4	Insert navigation CD	Loading may require several minutes	

5	Navigation menu	Call up navigation menu by pressing NAV button	**LANGUAGE POS TIME WHEEL**
6	Erase initial calibration	i **Applies only if unit has been calibrated initially. By turning on the right control knob (10) select menu "ENTER ADDRESS" and confirm by pressing control knob (10). Press multifunction key 2, then 7 and release simultaneously. Press CAL multifunction key.**	**CAL**
		By turning the right control knob (10) select menu "ERASE CALIBRATION" and confirm by pressing the control knob (10).	**After a certain waiting time the basic navigation menu appears**
7	Start-up	Park vehicle outside with Audio 30 APS switched on (minimum time for receiving GPS satellite signals approx. 30 min.). Call up navigation menu by pressing NAV button	**LANGUAGE POS TIME WHEEL**
8	Select language	Select desired language by pressing the multifunction key "SPRA"	
9	Enter tire size	Enter the tire size by pressing the multifunction key "WHEEL" and confirm by pressing the right control knob (10)	
10	Perform calibration drive	i The duration of the calibration drive depends on the vehicle model and number of changes in direction. It can be between 30 km and 100 km and can be interrupted at any time for as long as desired. Drive Audio 30 APS at least 300 meters straight ahead in the radio mode and then turn correctly to the right or left	

		(min. 60°), drive another 300 meters straight ahead and then turn again, etc. It makes no difference for the calibration if the course of the road does not allow the vehicle to be driven the specified route straight ahead or to turn min. 60°. This only increases the length of the route to be driven. Calibration is completed when the location is indicated in the AUDIO mode (without active objective guidance) when the INFO button is pressed. [i] However, the location can only be displayed when the vehicle is driven on a digitized road.	
11	Perform test drive	Call up navigation menu by pressing the NAV multifunction button. Enter destination (see operating instructions) and drive to destination.	

	Start-up step	Action on keypad	Feedback on display
	Accelerated start-up		
1	Insert navigation CD	Loading time can take several minutes	
2	Navigation menu	Call navigation menu by pressing NAV button	**LANGUAGE POS TIME WHEEL**
3	Call default calibration values	[i] **Select the menu "ADDRESS ENTRY" by turning right knob (10) and confirm by pressing knob (10). Press multifunction buttons 2 and 7 one after another and then release simultaneously. Press multifunction button KAL.** Select the menu	**CAL** **Vehicle menu appears**

		"Calibration value defaults" by turning right knob (10) and confirm by pressing knob (10).	
4	Enter type of vehicle	Select given entry, e.g. MB pass. car. i Only for vehicles as of model year 1998.	**MB pass. car**
5	Enter tire parameters	Enter complete values	**Wheel**
6	Store parameters	Select entry "Store values"	**System restart**
		i The vehicle is now calibrated and is ready for use with GPS reception of "Fix ZD". A calibration drive is no longer required.	

RETROFIT ANTENNA FOR GLOBAL POSITIONING SYSTEM (GPS) - AN82.61-P-7474-04AZ

Model 163 up to 31.8.00

1. Install the combination antenna on roof as specified in the enclosed installation instructions of the manufacturer Kathrein.

   i Radiator does not need to be shortened for GSM telephones.

2. Expose the antenna lead (40) already installed in the vehicle, in the radio slot and connect to antenna diplexer (A2/57) at the middle connection.
3. Connect GPS antenna lead (41) to GPS output.

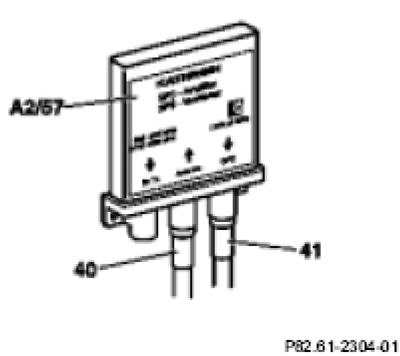


Fig. 238: Identifying Antenna Diplexer And Antenna Lead

4. Fit on antenna diplexer (A) in left of radio slot at longitudinal strut, as shown in figure.

40 Antenna line
41 GPS antenna lead

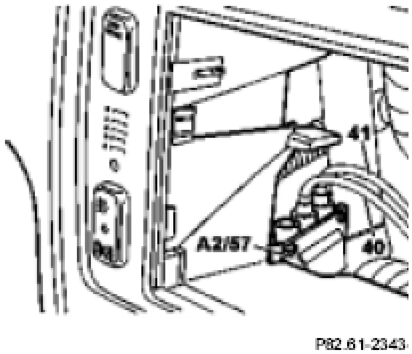


Fig. 239: Identifying Antenna Diplexer, Antenna Line And GPS Antenna Lead

RETROFIT FIBER OPTIC CABLE WIRING HARNESS - AN82.70-P-0002-01GH

Connection diagram of fiber optic cable

1. Prepare fiber optic cable wiring harness (30) as shown in figure.

   i The vehicle is preinstalled with a fiber optic cable for the CD player with changer. This fiber optic cable is tied back in the radio slot and is not required in this case.

A2 Radio
A34/4 CTEL [TEL] interface
A40/3 COMAND operating, display and control unit

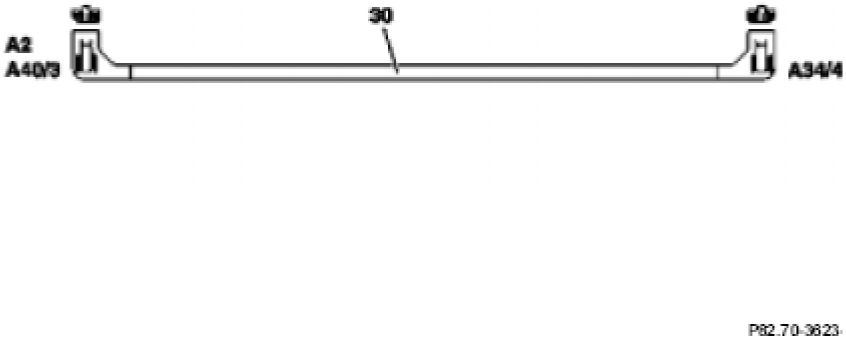
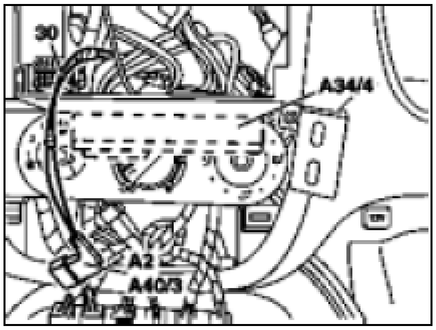


Fig. 240: Identifying Connection Diagram Of Fiber Optic Cable

2. Connect fiber optic cable wiring harness (30) to the CTEL interface (A34/4).
3. After installing CTEL interface (A34/4) in the center console, route fiber optic cable wiring harness (30) into the radio slot.
4. Connect wiring harness when installing radio (A2) or COMAND (A40/3).

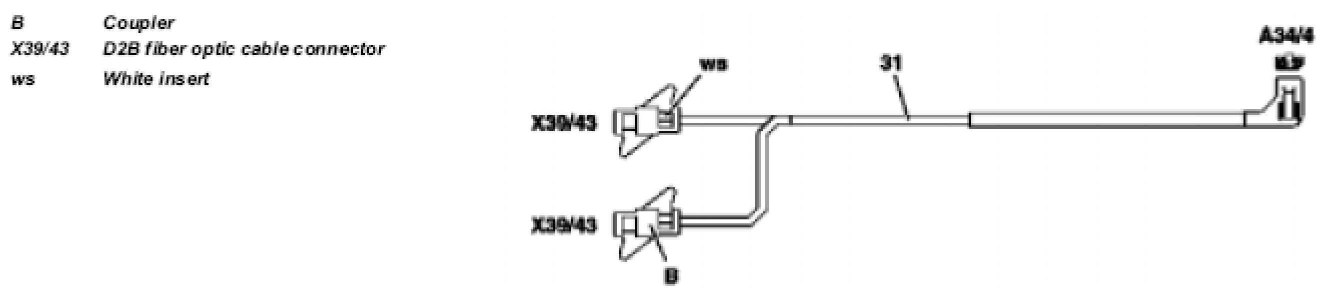


P82.70-3624-01

Fig. 241: Identifying CTEL Interface And Fiber Optic Cable Wiring Harness

RETROFIT FIBER OPTIC CABLE WIRING HARNESS - AN82.70-P-0002-01GHH

1. Prepare fiber optic cable wiring harness (31) as shown in figure.
2. Connect fiber optic cable wiring harness (31) to the CTEL interface (A34/4).



P82.70-3625

Fig. 242: Identifying Fiber Optic Cable Wiring Harness Connection

i The D2B fiber optic cable ring is enlarged with two new fiber optic cable modules M2 and M3. Module M5 remains unchanged in the vehicle.

Shown on vehicle with radio

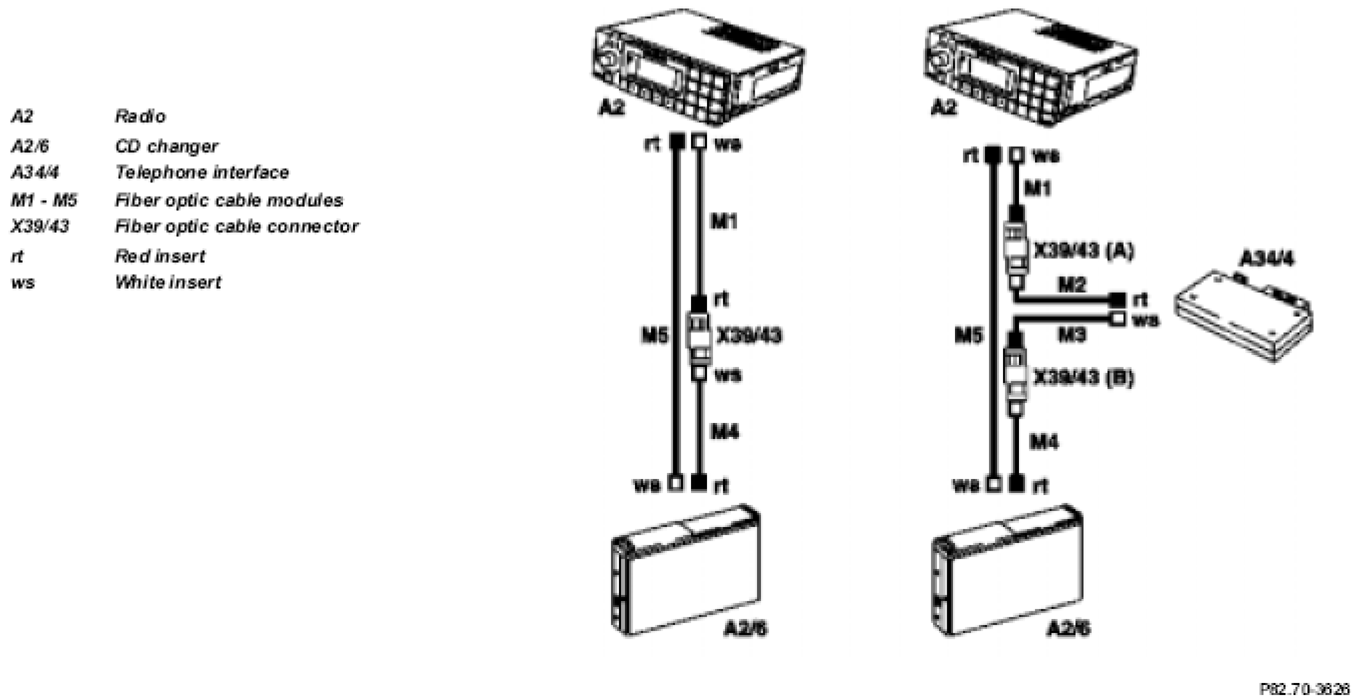


Fig. 243: Identifying Radio, CD Changer And CTEL Interface

3. After installing the interface in the radio slot, expose fiber optic cable connector (X39/43) (A), offnen and take out the white insert (ws).

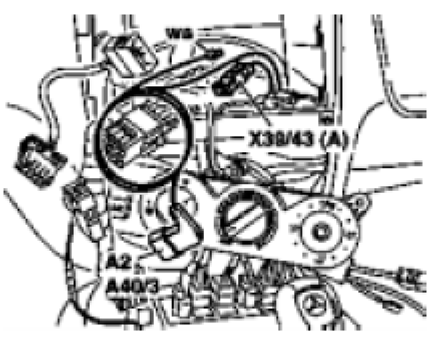


Fig. 244: Identifying White Insert And Fiber Optic Cable Connector

4. Place the white insert (ws) of the fiber optic cable wiring harness (31) into the fiber optic cable connector (X39/43) (A) and close again.
5. Open the fiber optic cable connector (X39/43) (B) of the fiber optic cable wiring harness (31), place in the white insert (ws) of the standard wiring harness and close again.

Shown on vehicle with radio A2 Radio

A2	*Radio*
A2/56	*CD player with changer*
A34/4	*Portable CTEL interface*
rt	*Red insert*

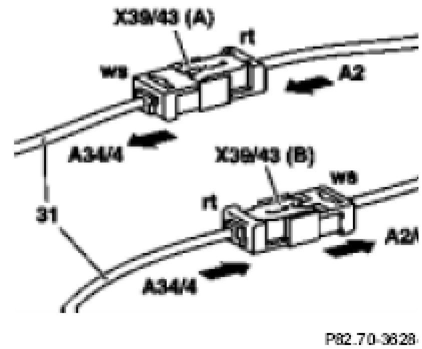


Fig. 245: Identifying Fiber Optic Cable Connector (X39/43) (B) And Fiber Optic Cable Wiring Harness

CONNECT WIRING HARNESS - AZ82.20-P-0001-02B

Model 163.113/128/136/154/172/174/175

Do not touch parts which conduct high voltages. Persons who wear electronic implants (e.g. heart pacemakers) must not carry out any work on such components.

Connection diagram of wiring harness of illuminated door sill molding

1	*Wiring harness of door sill molding*
2	*Branch of invert illuminated strip*
5	*2-pin connector of illuminated door sill molding*
6	*4-pin connector of circuit 30*
7	*Retaining clips*
8	*4-pin connector of illuminated door sill molding*
bl	*Blue cable of left illuminated door sill molding*
rs	*Pink cable of right illuminated door sill molding*

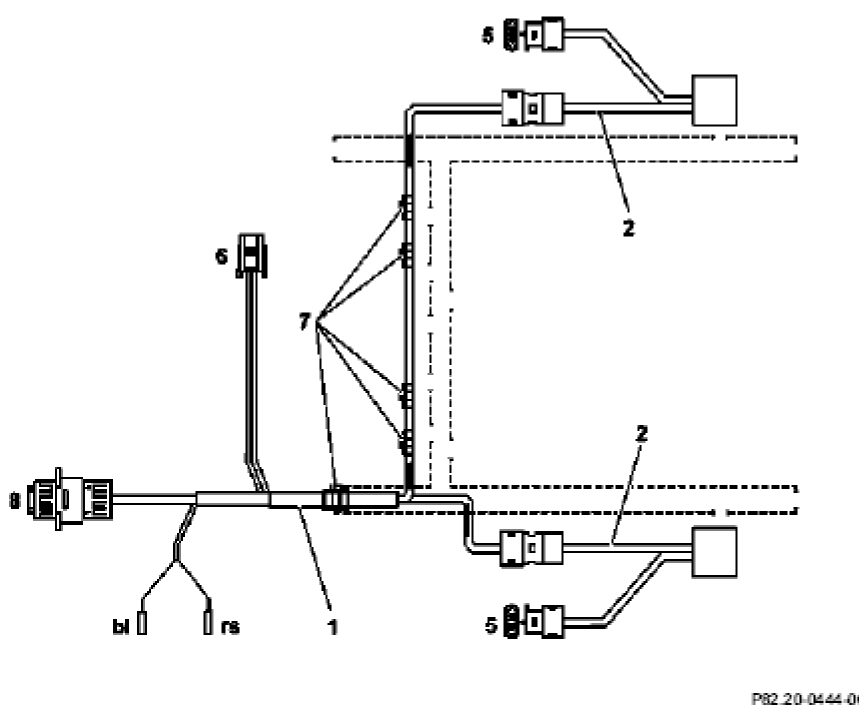
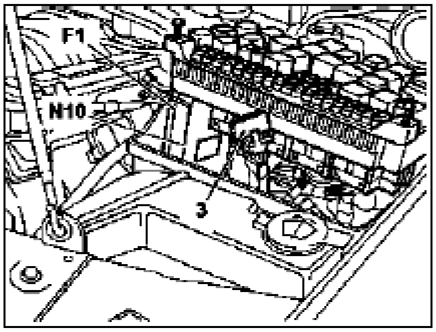


Fig. 246: Connection Diagram Of Wiring Harness Of Illuminated Door Sill Molding

1. Raise fuse block in fuse and relay module (F1).
2. Push to the side the foam rubber block for cable opening into interior.

3. Route front part (6, 8, bl, rs) of wiring harness (1) of illuminated door sill moldings from left footwell to fuse and relay module (F1).



P82.20-0438-01

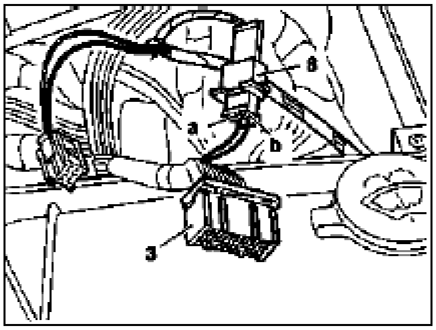
Fig. 247: Identifying Relay Module, AAV Module And Connector

4. Pull gray 24-pin connector (3) off AAV module (N10).
5. Take blue cable (b) of left front door rotary tumbler out of chamber A8 and red cable (a) of right front door rotary tumbler out of chamber B11 of connector (3).
6. Insert blue cable (b) into chamber 1 and red cable (a) into chamber 2 of the 4-pin coupling.

   i While this is done, the blue cable is then connected to the blue cable and the pink cable to the red cable.

7. Connect 4-pin coupling to connector (8) of wiring harness of illuminated door sill molding.

   i Only if coupling is not already fitted to the connector (8).



P82.20-0440-01

Fig. 248: Identifying Blue Cable, Red Cable And Connector

8. Insert blue cable of left illuminated door sill molding (bl) into chamber A8 and pink cable of right illuminated door sill molding (rs) into chamber B11 of 24-pin coupling (3).
9. Connect coupling (3) to AAV module (N10).

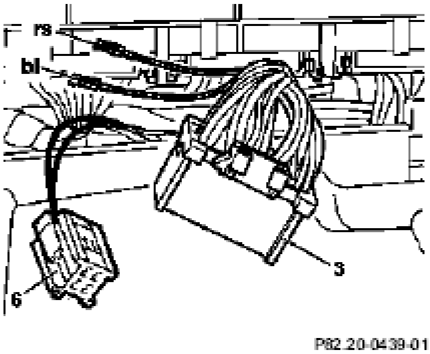


Fig. 249: Identifying 24-Pin Coupling And 4-Pin Coupling

Only for model 163.136/154/172/174 up to VIN A289564, X754619.

10.1 Connect 4-pin coupling (6) of wiring harness of illuminated door sill molding to relay module at plug point K10.

Only for model 163.113/128 and model 163.154/174/175 as of VIN A289565, X754620.

10.2 Remove red cable (9) from 4-pin coupling (6).

Only for model 163.113/128.

11.1 Separate 24-pin coupling (10) from connector **P/D** in fuse block.

12.1 Insert red cable (9) into chamber **11** of 24-pin coupling (10).

13.1 Connect coupling (10) to connector **P/D** in fuse block.

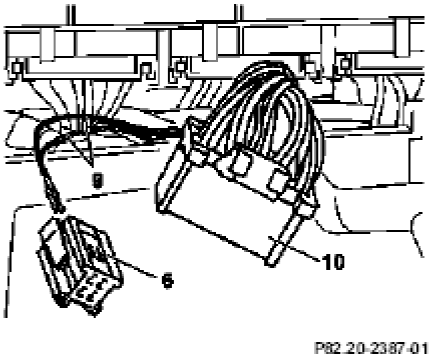


Fig. 250: Identifying Coupling And Red Cable

Only for model 163.154/174/175 as of VIN A289565, X754620.

11.2 Unplug 24-pin coupling (11) from connector **P/B** in fuse block.

12.2 Insert red cable (9) into chamber **12** of 24-pin coupling (11).

13.2 Connect coupling (11) to connector **P/B** in fuse block.

Only if fuse is not already present.

14 Insert enclosed 15 A fuse into plug position F40.

15 Fix wiring harness of illuminated door sill molding in fuse and relay module (F1).

16 Attach fuse block.

[i] 2 bolts.

17 Insert foam rubber block into rear of fuse and relay module.

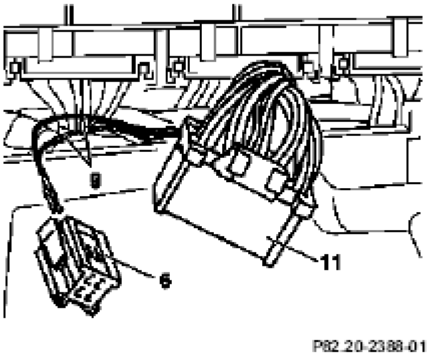


Fig. 251: Identifying 24-Pin Coupling And 4-Pin Coupling

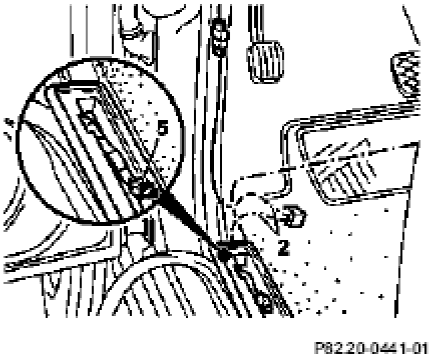


Fig. 252: Identifying 2-Pin Coupling And Harness Inverter

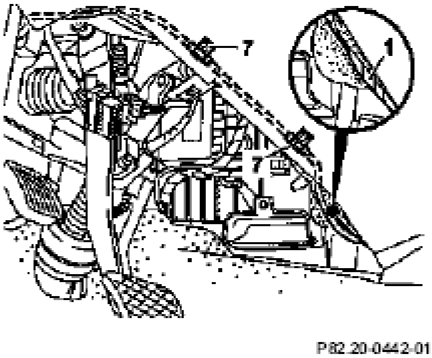


Fig. 253: Identifying Retaining Clips And Wiring Harness

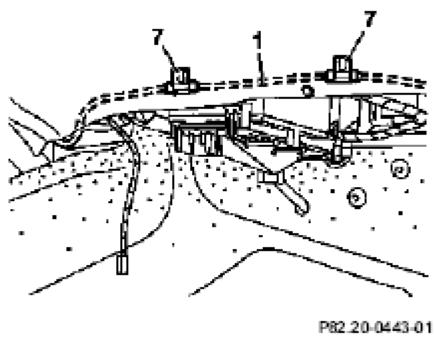


Fig. 254: Identifying Retaining Clips

18 Route wiring harness for left front door along A-pillar up to door sill molding.

19 Place wiring harness inverter (2) below door guard panel.

i Ensure that the door sill molding still fits flat onto the floor covering.

20 Insert 2-pin coupling (5) into bottom part of door sill molding.

21 Run wiring harness (1) for front right door below instrument panel up to right

A-pillar and attach to knee pad with retaining clips (7).

22 Route wiring harness (1) for front right door up to right door sill molding.

23 Insert 2-pin coupling (5) into bottom part of door sill molding and position wiring harness inverter in the same way as on the left-hand side.

RETROFITTING ILLUMINATED DOOR SILL MOLDING - AZ82.20-P-0001B

MODEL 163.113 /128 /136 /154 /172 /174 /175

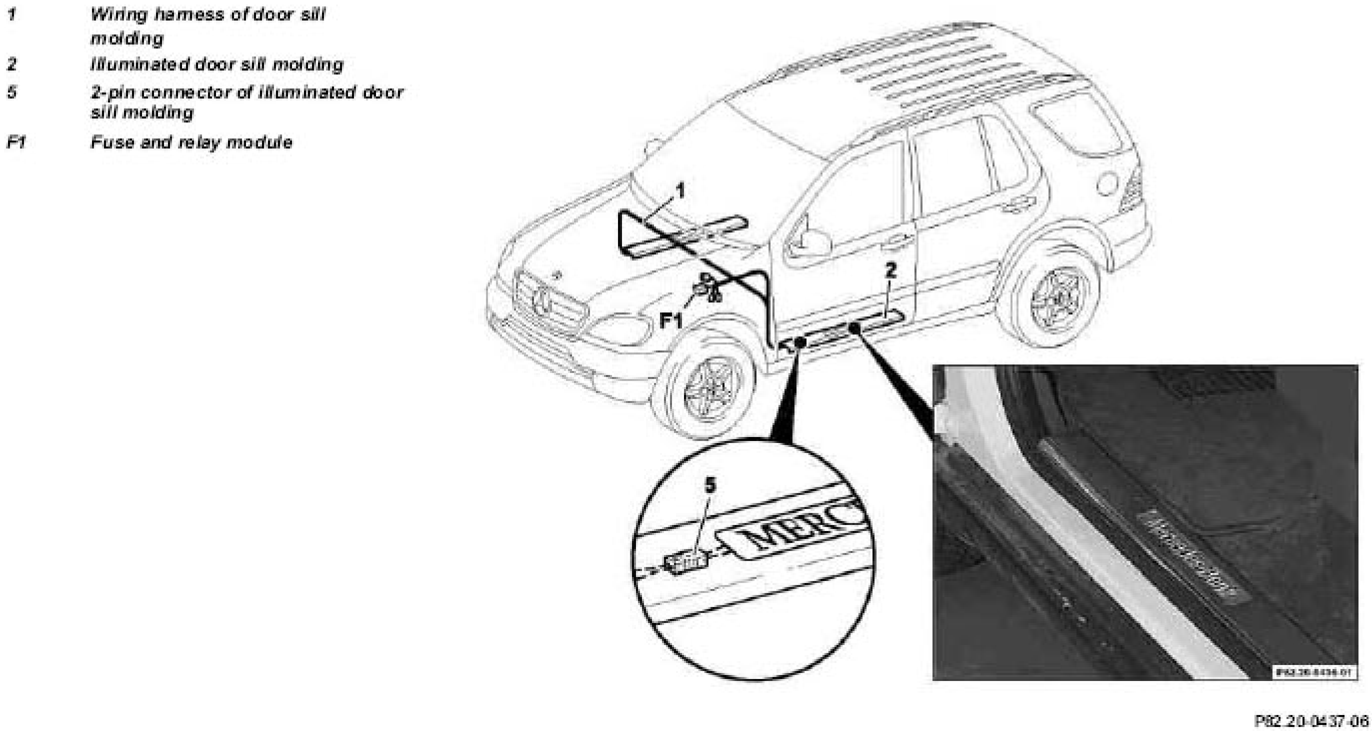


Fig. 255: Identifying Retrofitting Illuminated Door Sill Molding Components

ⓘ It is also possible to order the illuminated door sill molding with the lettering "AMG" - see parts ordering notes.

	Removal		
⚠ Danger!	Contact with components under high voltage can pose lethal hazard	Do not touch parts which conduct high voltages. Persons who wear electronic implants (e.g. heart pacemakers) must not carry out any work on such components.	**AS00.00-Z-0020-01A**
1	Connect quiescent current retention unit		***WH58.30-Z-1012-09A**
2 AR	Disconnect ground cable of battery		**AR54.10-P-0003A**
3	Open fuse and relay module (F1)	ⓘ 2 covers. Rear cover is attached with 5 screws.	
4	Remove screws for fuse block	ⓘ 2 screws at front.	
5	Remove door sill moldings on right and left	ⓘ Up to VIN A145272, X708318: Begin in the	

	driver side	middle in order to avoid damaging the retaining clips. As of VINA145273, X708319: Begin at the front in order to avoid damaging the retaining clips.	**Fig. 155**
6	Take out the two frontmost screws of the door sill molding at the right and left driver side		
7	Pull off door rubber seal at bottom of right and left driver door		
8 AR	Remove cover below left of instrument panel		**AR68.10-P-1500GH**
9 AR AR	Remove cover below instrument panel on right	i Up to VIN A145272, X708318 i As of VIN A145273, X708319	**AR68.10-P-1520GH** **AR68.10-P-1520GI**
10 AR	Remove right and left paneling in footwell		**AR68.30-P-4010GH**
	Install		
11	Install wiring harness for illuminated door sill molding and connect		**AZ82.20-P-0001-02B**
12	Insert the front screws of the right and left door sill molding trim		
13	Stick luminous foil onto rear of illuminated door sill molding	i The silver side of the luminous foil is the underside. Pull off protective foil of the double-sided adhesive tape on the rear of the door sill molding and stick on luminous foil.	
14	Connect illuminated door		

	sill molding to coupling (5) of wiring harness (1)		
15	Clip illuminated door sill moldings into door sill trim	[i] Ensure that the door sill moldings are not installed on the wrong sides and that the wiring harness is not pinched by the door sill molding.	
16	Stick rear door sill moldings onto standard moldings	[i] Only in the case of 4-part "AMG" parts kit.	
17	Carry out operational check		
18	Assemble in reverse order		

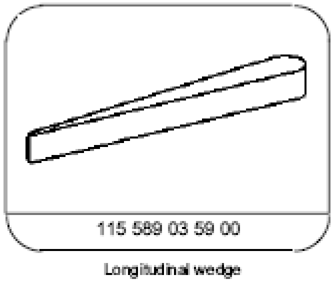


Fig. 256: Identifying Longitudinal Wedge (115 589 03 59 00)

Commercially available tools

Number	Designation
WH58.30-Z-1012-09A	Quiescent current retention unit

Parts ordering notes

Part no.	Designation	Quantity
B6 689 00 31	Illuminated door sill moldings with wiring harness (2-part with "Mercedes-Benz" logo)	1
B6 602 10 18	Illuminated door sill moldings with wiring harness (4-part with "AMG" logo)	1
B6 689 00 16	Lighting film, blue	1
B6 689 00 17	Lighting film, green	1
B6 689 00 18	Lighting film, yellow	1

RETROFIT CENTRAL INTERFACE MODULE - AZ82.60-P-0004-01A

Models 163.136/154/172 1A as of 145273, Models 163.136/154/172 1X as of 708319, Models 163.113/128 /157 /174 /175 1#

1. Place central interface module (1) on workbench.

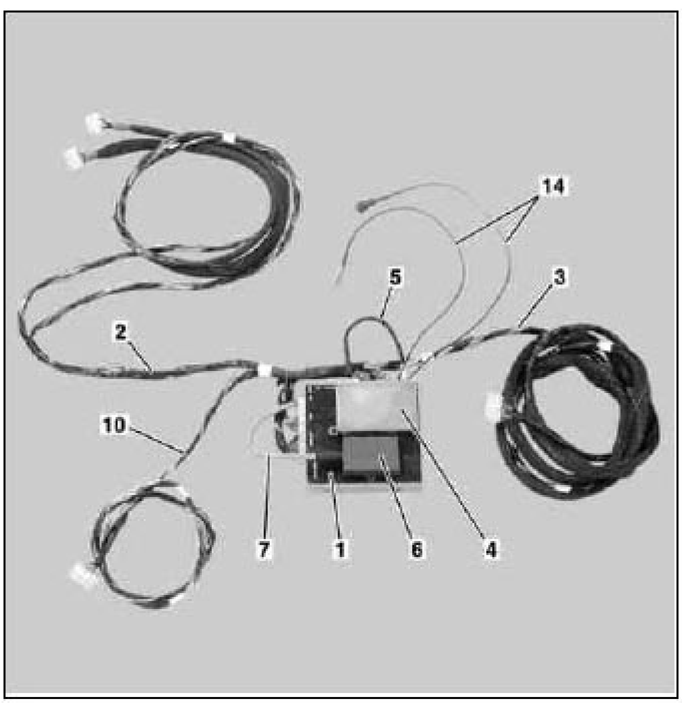
   ⓘ For LHS installation, note label on interface module (1).

2. Insert both plugs of the video/DVD player wiring harness (2) into interface module (1).

   ⓘ Color marks on the plugs must match the inputs on the interface module marked with the same color.

3. Insert both plugs of video monitor wiring harness (3) into interface module (1).
4. Secure FM modulator (4) on interface module with Velcro strip provided.

   ⓘ Attachment position marked on interface module.



P82.60-2377-12

Fig. 257: Identifying FM Modulator, Interface Module And Wireless Headphones

5. Insert FM modulator wiring harness (5) into interface module and FM modulator.

   6.1 Secure RF module for wireless headphones (6) on interface module with Velcro strip provided.

   ⓘ Only if provided. Attachment position marked on interface module.

   7.1 Insert RF module wiring harness (7) into interface module and RF module.

[i] If fitted.

8 Fold foam strips supplied (8) on the right-hand side around the lower edge of the instrument panel carrier (9) in the glove compartment opening.

9 Route additional interface module wiring harness (10) and video/DVD player wiring harness (2) into the glove compartment opening below the left-hand bracket for instrument panel (11).

[i] Route wiring harness before the interior wiring harness (12).

10 Route additional interface module wiring harness (10) and video/DVD player wiring harness (2) within the instrument panel (11) downwards, to the opening in the middle of the instrument panel above the transmission tunnel.

11 Secure the magnetic ring to the underside of the instrument panel carrier (11) with tie straps.

12 Route wiring harnesses on the right-hand side along the transmission tunnel.

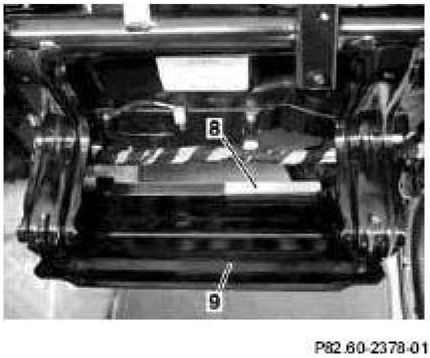


Fig. 258: Identifying Instrument Panel Carrier And Fold Foam Strips

13 Route video monitor wiring harness (3) through the glove compartment, below the right-hand bracket for the instrument panel (13) upwards to the A-pillar.

[i] Route wiring harness before the interior wiring harness (12). Ensure that the wiring harness passes behind the vent duct for the right lateral nozzle.

14 Lay down wiring harness carefully on instrument panel.

15 Clean upper edge of instrument panel carrier (9) in upper area where the interface module is secured in order to ensure maximum adhesion.

16 Detach protective foil from strips of adhesive tape at bottom of interface module.

17 Guide interface module into glove compartment opening and adhere to the upper edge of the instrument panel carrier (9).

[i] Align interface module in the center between the left and right-hand brackets at the upper edge of the bracket for the instrument panel (9).

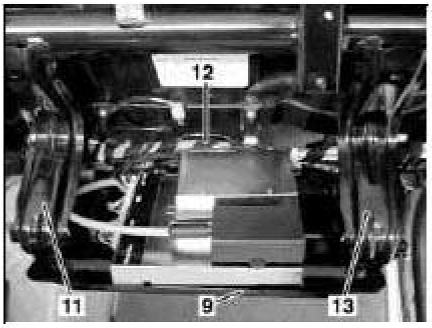


Fig. 259: Identifying Interior Wiring Harness And Bracket

18 Route antenna cable (14) of interface module below brackets of instrument panel at left to the radio installation slot.

i If fitted, guide through wiring harness under the telephone module.

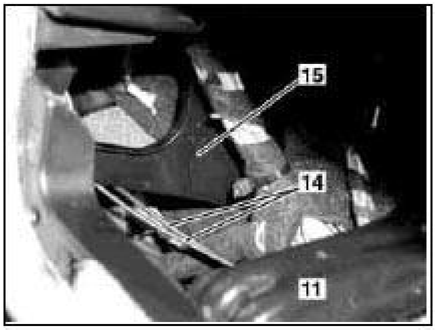


Fig. 260: Identifying Antenna Cable And Instrument Panel Carrier

RETROFIT VIDEO SYSTEM MONITOR - AZ82.60-P-0004-02A

Models 163.136/154/172 1A as of 145273, Models 163.136 /154 /172 1X as of 708319, Models 163.113/128 /157 /174 /175 1#, with power tilting/sliding roof in glass version, code 414a

1. Measure from the corner (1) of the tilting/ sliding roof frame (2) the dimension (a=410 mm) to the middle of the tilting/ sliding roof frame and mark the frame.

   i Do NOT mark the headliner. By cross-measuring from the other corner check whether the mark is in the center.

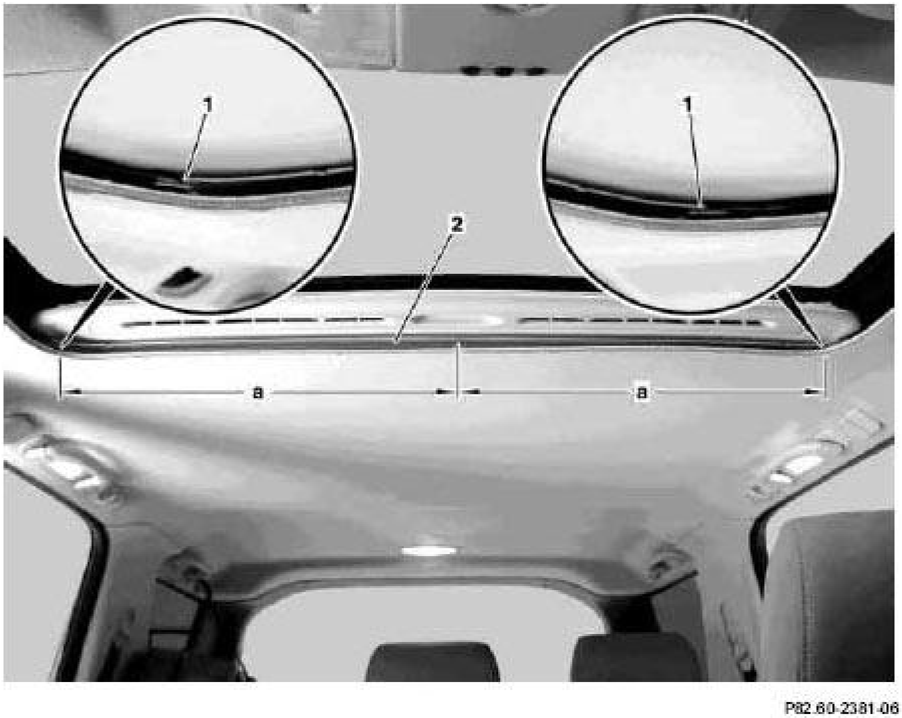


Fig. 261: Identifying Corner Of Tilting/ Sliding Roof Frame

2. Align the V-shaped cutout (3) on the rear side of the monitor bracket (4) at the marking on the tilting/sliding roof frame.

   i Leading edge of bracket to be flush with rear edge (5) of tilting/ sliding roof cutout.

3. Use monitor bracket (4) as template for marking headliner.

   i Do NOT mark or break out the rear edge (5) of the tilting/sliding roof cutout.

   i To mark the headliner use the rear side of the bracket. Mark headliner at side along the bracket as far as the front incisions (6) and the rear incision (7). Mark inside of incision (6) to determine the leading edge of the monitor cutout. Mark inside of rear incision (7) to determine rear edge of monitor cutout. Complete front and rear mark of the cutout using straightedge.

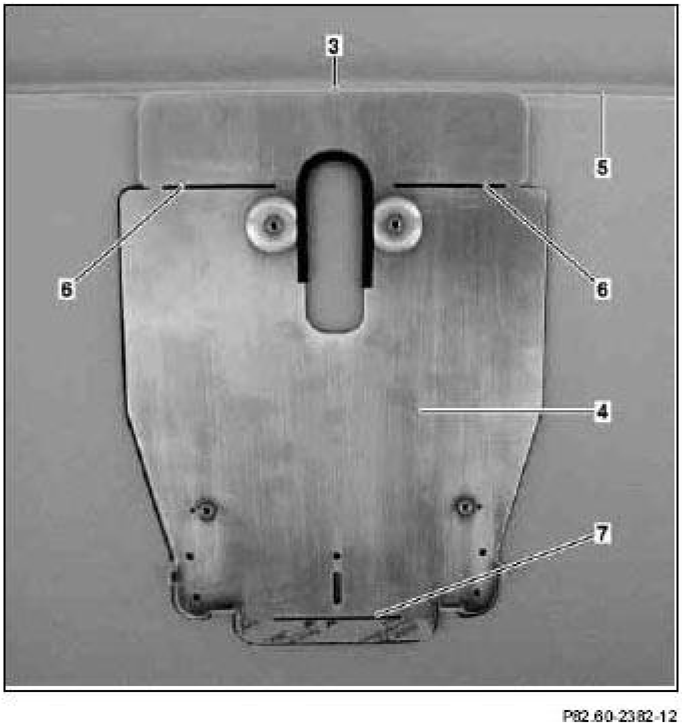


Fig. 262: Identifying V-Shaped Cutout On Rear Side Of Monitor Bracket

4. Remove marked area of the headliner.

   ℹ Close paneling of the sliding/pop-up roof to prevent damage.

   ℹ In order not to damage the headliner if the blade slips, cut inward starting from the corners. NEVER remove the cutout until the headliner has been severed completely along the mark.

5. Fasten monitor wiring harness (8) at the white adhesive tape markings using the available clips (9) and the attached, self-adhesive foamed material (10) to the right-hand A-pillar.
6. Route monitor wiring harness at top between the headliner and vehicle roof, next to the shock absorber at the right-hand A-pillar.

   ℹ Carefully pull headliner downward. Do not tear or bend headliner.

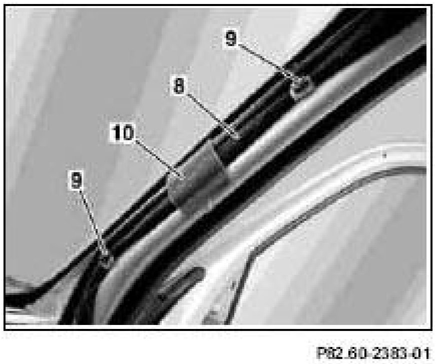


Fig. 263: Identifying Self-Adhesive Foamed Material, Monitor Wiring Harness And Clips

7. Route monitor wiring harness (8) next to the existing wiring harness (11).
8. Route monitor wiring harness in a curve to the monitor cutout in the headliner.

i Approximately 160 mm of the wiring harness should hang out of the monitor cutout.

9. Secure wiring harness to headliner using self-adhesive foamed material (12) supplied.

i **As of VIN A289565, X754620:** Ensure that wiring harness does not affect window airbag function.

i Route wiring harness as flat as possible.

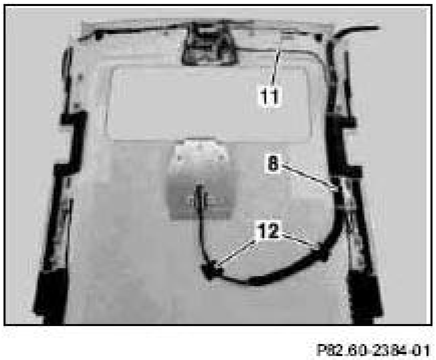


Fig. 264: Identifying Self-Adhesive Foamed Material, Monitor Wiring Harness And Existing Wiring Harness

10. Apply straightedge to the marking in the center of the tilting/ sliding roof frame and mark the crossmember.

i Use marking (13) to center the monitor bracket. Only mark the two ribs that are visible if the headliner is pressed against the cross member.

11. Remove the protective foil from the strip of adhesive tape on the monitor bracket.

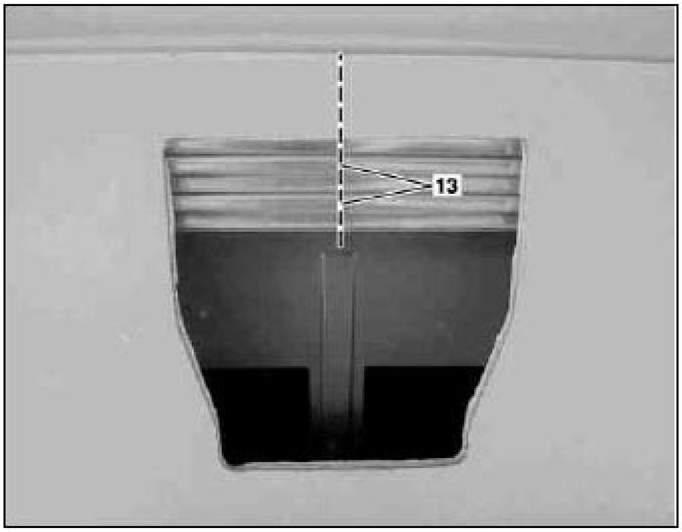


Fig. 265: Identifying Mark On Center Monitor Bracket

12. Adhere bracket to crossmember ribs.

    i Align the center incision of the monitor bracket (4) to the front marking on the crossmember. Guide lugs (15) of the bracket latch at front in the grooves of the crossmember.

13. Route monitor wiring harness (8) through opening (16) in rear area of bracket.
14. Provide bore hole with Ø = 5 mm through bracket and cross member of sliding/pop-up roof frame.

    i Use guide hole (17) provided in the bracket. To prevent damage to the vehicle roof, limit drilling depth to 10 mm. Cover interior to collect the chips.

15. Rivet bracket with rivet supplied to crossmember of tilting/sliding roof frame.

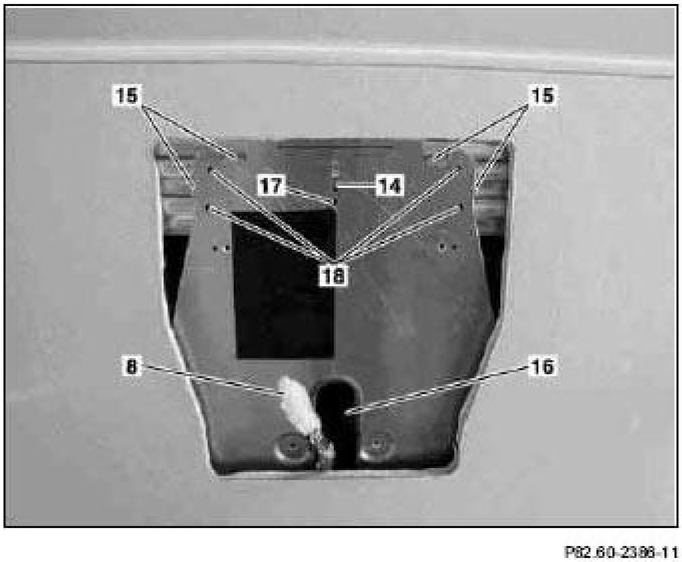


Fig. 266: Identifying Guide Hole, Guide Lugs And Monitor Wiring Harness

16. Provide four further bore holes with Ø = 5 mm through bracket and crossmember of tilting/sliding roof frame.

    i Use guide holes (18) provided in the bracket. To prevent damage to the vehicle roof, limit drilling depth to 10 mm. Cover interior to collect the chips.

17. Rivet bracket with rivets supplied to crossmember of tilting/ sliding roof frame.

    i 4 rivets.

18. Install edge guard for sliding/pop-up roof cutout in headliner.
19. Insert monitor wiring harness into video monitor unit (19).
20. Open video display (20) and remote control storage compartment (21).

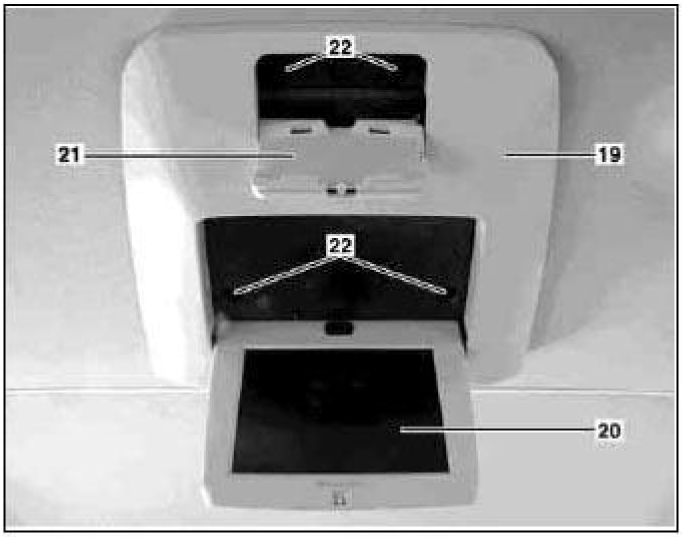


Fig. 267: Identifying Video Display, Video Monitor Unit And Remote Control Storage Compartment

21. Secure video monitor unit (19) to bracket.

    ⓘ Do NOT overtighten mounting screws.

    ⓘ Use guide pins of video monitor unit to locate the installation position and secure at 4 points (22) with bolts provided.

22. Close video display (20) and remote control storage compartment (21).

RETROFIT VIDEO SYSTEM MONITOR - AZ82.60-P-0004-02B

Models 163.136/154/172 1A as of 145273, Models 163.136 /154 /172 1X as of 708319, Models 163.113/128 /157 /174 /175 1#, except power tilting/sliding roof in glass version, code 414a

1. Attach adhesive tape from the interior lamps (1) as far as the rear handles.

    ⓘ The adhesive tape should have the same width as the interior lamps (1). Use lightly adhering adhesive tape to prevent damage to the headliner.

2. Measure off distance (a) between the rear fastening points of the front handles (23), halve distance and mark on the strips of adhesive tape.

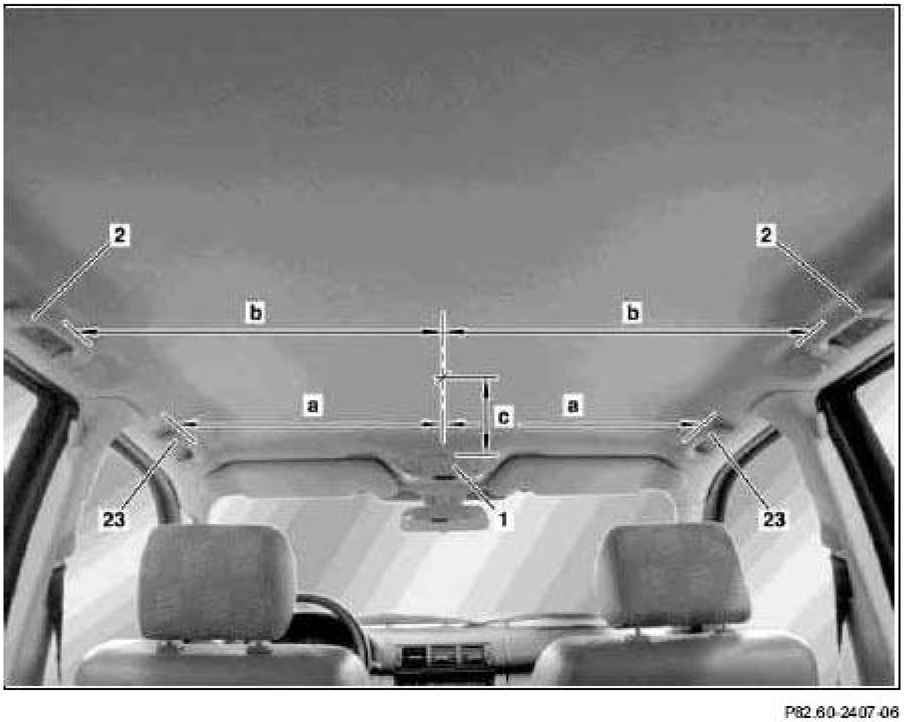


Fig. 268: Identifying Distance (A) Between Rear Fastening Points Of Front Handles (23)

3. Measure off distance (a) between the front fastening points of the rear handles (2), halve distance and mark on the strips of adhesive tape.
4. Join both marks by a line.
5. Measure from the trailing edge of the interior lamp (1) 340 mm (c) and mark on the center line.

   i This is where the leading edge of the monitor bracket is applied.

6. Align the V-shaped cutout (3) on the rear side of the monitor bracket (4) at the marking on the adhesive tape.

   i The bracket should be at a distance of 340 mm from the interior light.

7. Use monitor bracket (4) as template for marking the adhesive tape.

   i Do NOT mark beyond the edge of the template.

   i To mark the adhesive tape, use the rear side of the bracket. Mark headliner at side along the bracket as far as the front incisions (6) and the rear incision (7). Mark inside of incisions (6) and (7) to determine the leading edge of the monitor cutout. Complete front and rear mark of the cutout using straightedge.

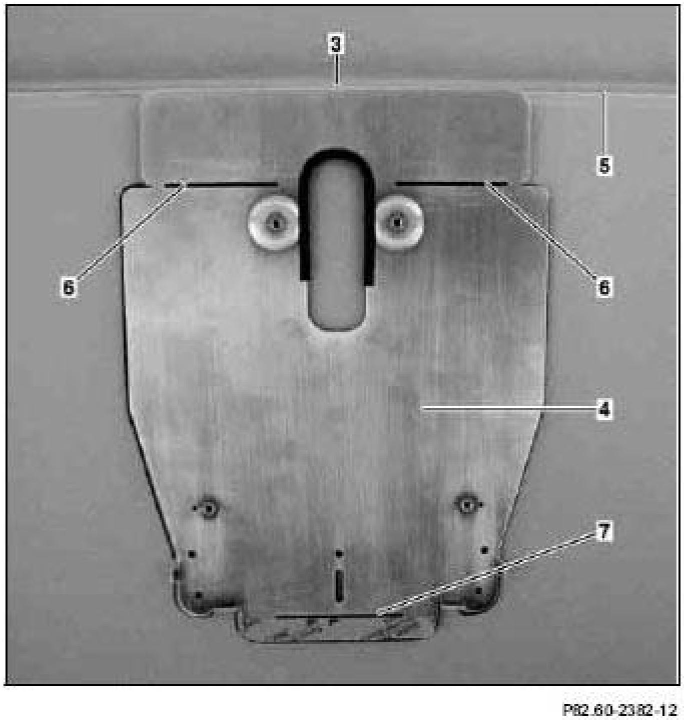


Fig. 269: Identifying V-Shaped Cutout (3) On Rear Side Of Monitor Bracket (4)

8. Remove marked area of the headliner.

   [i] In order not to damage the headliner if the blade slips, cut inward starting from the corners. DO NOT remove the cutout as long as the headliner has not been fully removed along the marking.

9. Fasten monitor wiring harness (8) at the white adhesive tape markings using the available clips (9) and the attached, self-adhesive foamed material (10) to the right-hand A-pillar.
10. Route monitor wiring harness at top between the headliner and vehicle roof next to the shock absorber.

   [i] **Carefully** pull headliner downward. Do not tear or bend headliner.

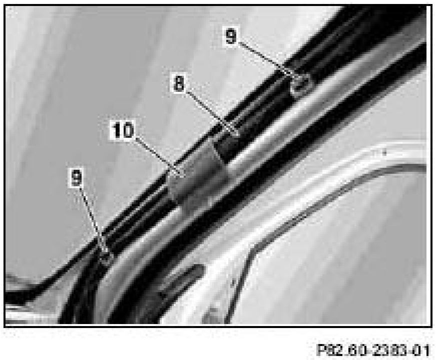


Fig. 270: Identifying Self-Adhesive Foamed Material, Monitor Wiring Harness And Clips

11. Route monitor wiring harness (8) next to the existing wiring harness (11).
12. Route monitor wiring harness in a curve to the monitor cutout in the headliner.

    ⓘ Approximately 160 mm of the wiring harness should hang out of the monitor cutout.

13. Secure wiring harness to the headliner using self-adhesive foamed material (12) supplied.

    ⓘ **As of VIN A289565, X754620:** Ensure that wiring harness does not affect window airbag function.

    ⓘ Route wiring harness as flat as possible.

Headliner shown with tilting/sliding roof

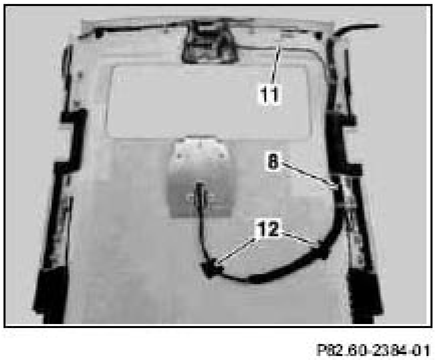


Fig. 271: Identifying Existing Wiring Harness, Monitor Wiring Harness And Self-Adhesive Foamed Material

14. Apply straightedge to the front center line on the adhesive tape and mark both ribs on the crossmember.

    ⓘ Use marking (13) to center the monitor bracket.

15. Remove the protective foil from the strip of adhesive tape on the monitor bracket.

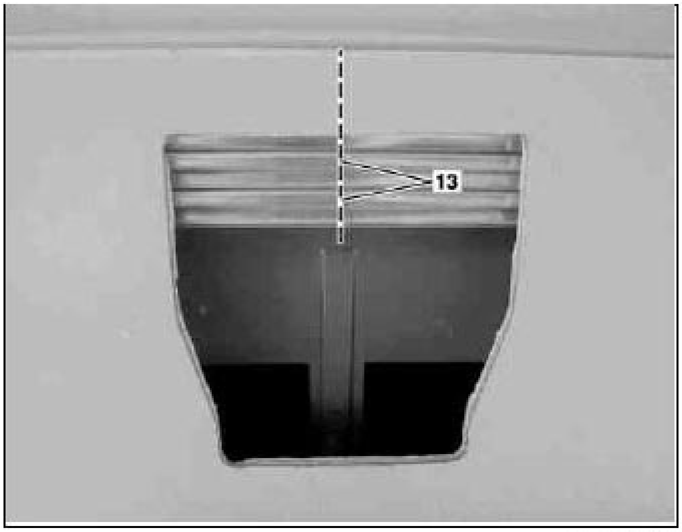


Fig. 272: Identifying Mark On Center Monitor Bracket

16. Adhere bracket to crossmember ribs.

    i Align the center incision (14) of the monitor bracket to the marking on the crossmember (25). Guide lugs (15) of the monitor bracket latch at front in the grooves (26) of the crossmember.

17. Route monitor wiring harness (8) through opening (16) in rear area of bracket.
18. Provide bore hole with Ø = 5 mm through bracket and crossmember.

    i Use guide hole (17) provided in the bracket. To prevent damage to the vehicle roof, limit drilling depth to 5 mm. Cover interior to collect the chips.

19. Rivet bracket with rivet supplied to crossmember of tilting/sliding roof frame.

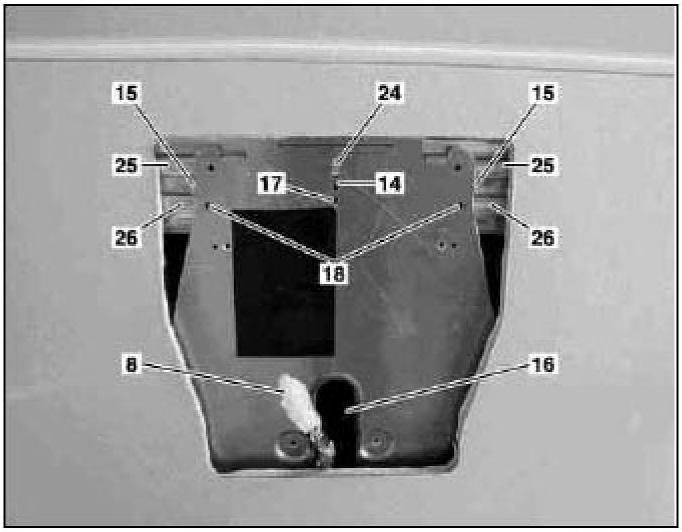


Fig. 273: Identifying Guide Hole, Crossmember And Monitor Wiring Harness

20. Provide two further bore holes with Ø = 5 mm through bracket and crossmember of tilting/sliding roof frame.

    ℹ Use guide holes (18) provided in the bracket. To prevent damage to the vehicle roof, limit drilling depth to 5 mm. Cover interior to collect the chips.

21. Rivet bracket with rivet supplied to crossmember.

    ℹ 2 rivets.

22. Remove adhesive tape from the headliner.
23. Insert monitor wiring harness into video monitor unit (19).
24. Open video display (20) and remote control storage compartment (21).
25. Secure video monitor unit (19) to bracket.

    ℹ Do NOT overtighten mounting screws.

    ℹ Use guide pins of video monitor unit to locate the installation position and secure at 4 points (22) with bolts provided.

26. Close video display (20) and remote control storage compartment.

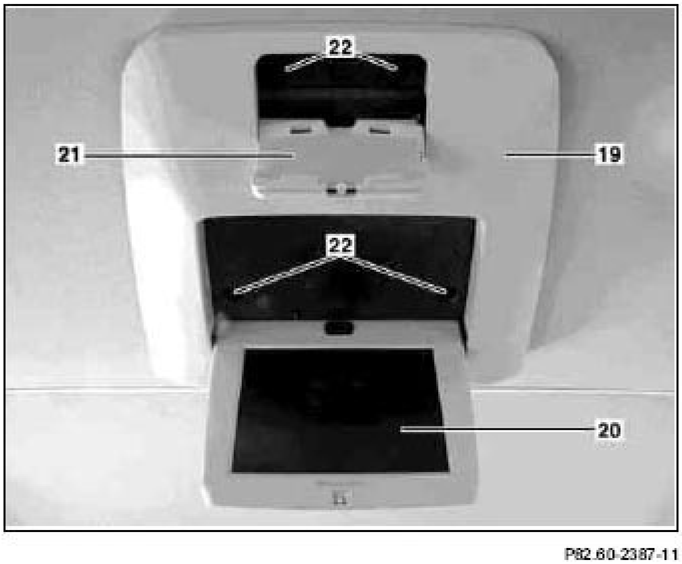


Fig. 274: Identifying Video Display, Video Monitor Unit And Remote Control Storage Compartment

RETROFIT VIDEO SYSTEM MONITOR - AZ82.60-P-0004-02C

Model 163.136 /154 /172 2A as of 145273, Models 163.136 /154 /172 2X as of 708319, Models 163.113/128 /157 /174 /175 2#, with power tilting/sliding roof in glass version, Code 414a

1. Measure from the corner (1) of the tilting/ sliding roof frame (2) the dimension (a=410 mm) to the middle of the tilting/ sliding roof frame and mark the frame.

   i Do NOT mark the headliner. By cross-measuring from the other corner check whether the mark is in the center.

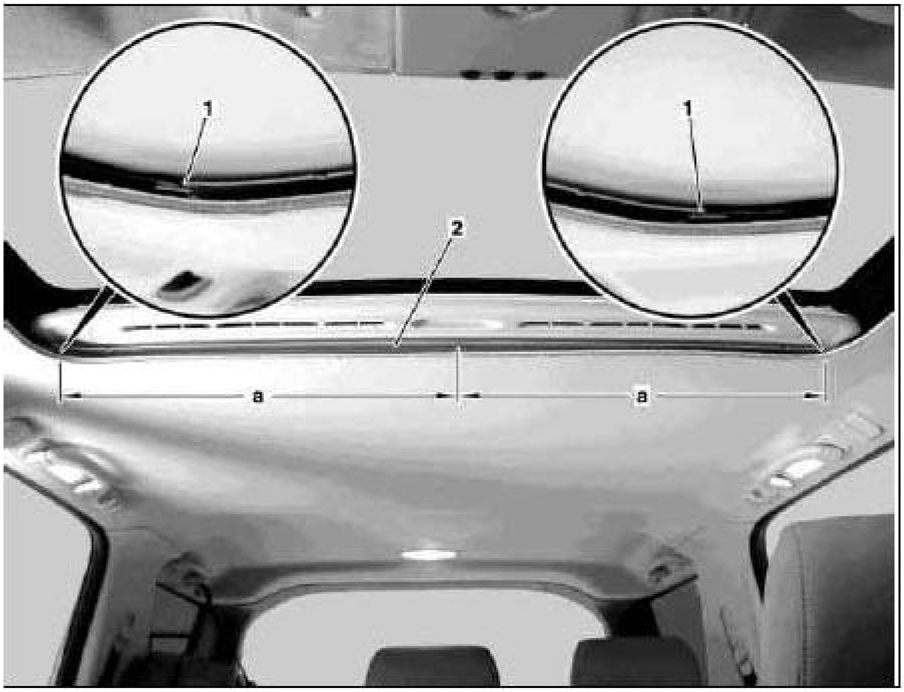


Fig. 275: Identifying Corner (1) Of Tilting/ Sliding Roof Frame

2. Align the V-shaped cutout (3) on the rear side of the monitor bracket (4) at the marking on the tilting/sliding roof frame.

   i Leading edge of bracket to be flush with rear edge (5) of tilting/ sliding roof cutout.

3. Use monitor bracket (4) as template for marking headliner.

   i Do NOT mark or break out the rear edge (5) of the tilting/sliding roof cutout.

   i To mark the headliner use the rear side of the bracket. Mark headliner at side along the bracket as far as the front incisions (6) and the rear incision (7). Mark inside of the front incision (6) and the rear incision (7)to determine the front and rear edges of the monitor cutout. Complete front and rear mark of the cutout using straightedge.

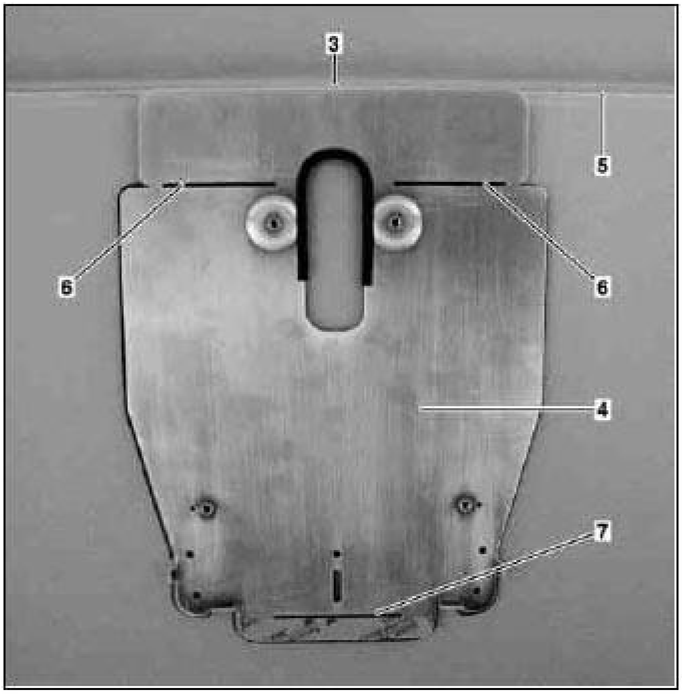


Fig. 276: Identifying V-Shaped Cutout (3) On Rear Side Of Monitor Bracket

4. Remove marked area of the headliner.

   ⓘ Close paneling of the sliding/pop-up roof to prevent damage.

   ⓘ In order not to damage the headliner if the blade slips, cut inward starting from the corners. NEVER remove the cutout until the headliner has been severed completely along the mark.

5. Fasten monitor wiring harness (8) at the white adhesive tape markings using the available clips (9) and the attached, self-adhesive foamed material (10) to the left-hand A-pillar.
6. Route monitor wiring harness at top between the headliner and vehicle roof, next to the shock absorber at the left-hand A-pillar.

   ⓘ Carefully pull headliner downward. Do not tear or bend headliner.

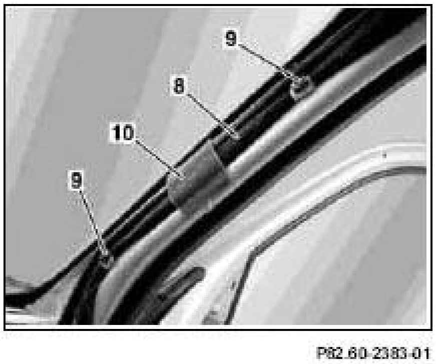


Fig. 277: Identifying Self-Adhesive Foamed Material, Monitor Wiring Harness And Clips

7. Route monitor wiring harness (8) next to the existing wiring harness (11).
8. Route monitor wiring harness in a curve to the monitor cutout in the headliner.

   ⓘ Approximately 160 mm of the wiring harness should hang out of the monitor cutout.

9. Secure wiring harness to headliner using self-adhesive foamed material (12) supplied.

   ⓘ **As of VIN A289565, X754620:** Ensure that wiring harness does not affect window airbag function.

   ⓘ Route wiring harness as flat as possible.

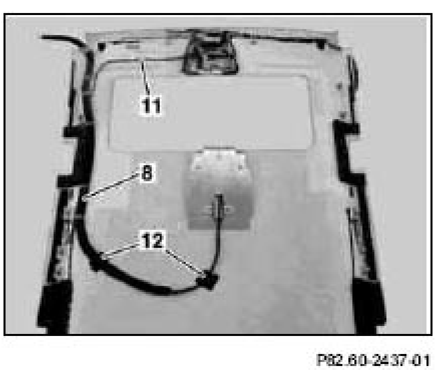


Fig. 278: Identifying Existing Wiring Harness, Monitor Wiring Harness And Self-Adhesive Foamed Material

10. Apply straightedge to the marking in the center of the tilting/ sliding roof frame and mark the crossmember.

    ⓘ Use marking (13) to center the monitor bracket. Only mark the two ribs that are visible if the headliner is pressed against the cross member.

11. Remove the protective foil from the strip of adhesive tape on the monitor bracket.

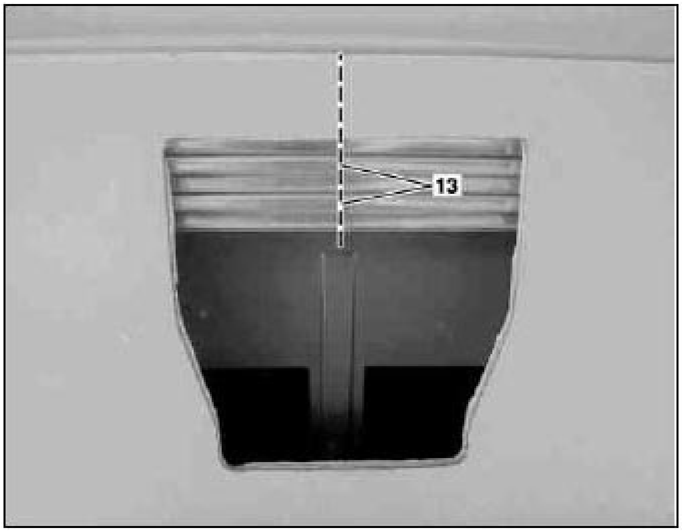


Fig. 279: Identifying Mark On Center Monitor Bracket

12. Adhere bracket to crossmember ribs.

    i Align the center incision of the monitor bracket (4) to the front marking on the crossmember. Guide lugs (15) of the bracket latch in the grooves of the crossmember.

13. Route monitor wiring harness (8) through opening (16) in rear area of bracket.
14. Provide bore hole with Ø = 5 mm through bracket and cross member of sliding/pop-up roof frame.

    i Use guide hole (17) provided in the bracket. To prevent damage to the vehicle roof, limit drilling depth to 10 mm. Cover interior to collect the chips.

15. Rivet bracket with rivet supplied to crossmember of tilting/sliding roof frame.

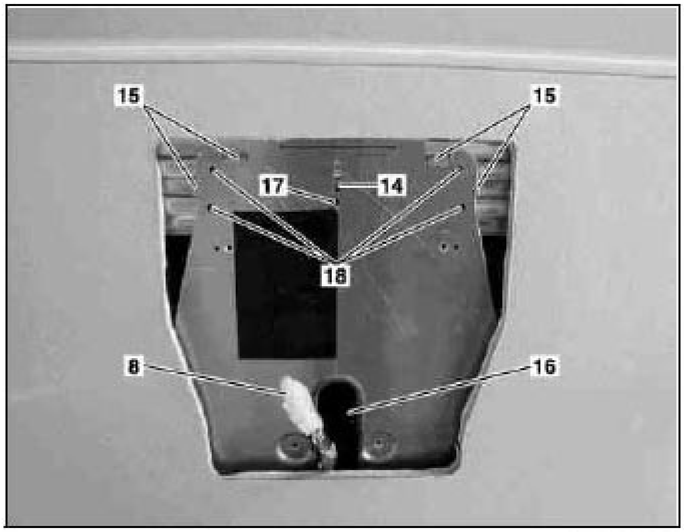


Fig. 280: Identifying Guide Hole, Crossmember And Monitor Wiring Harness

16. Provide four further bore holes with Ø = 5 mm through bracket and crossmember of tilting/sliding roof frame.

    [i] Use guide holes (18) provided in the bracket. To prevent damage to the vehicle roof, limit drilling depth to 10 mm. Cover interior to collect the chips.

17. Rivet bracket with rivets supplied to crossmember of tilting/ sliding roof frame.

    [i] 4 rivets.

18. Install edge guard for sliding/pop-up roof cutout in headliner.
19. Insert monitor wiring harness into video monitor unit (19).
20. Open video display (20) and remote control storage compartment (21).
21. Secure video monitor unit (19) to bracket.

    [i] Do NOT overtighten mounting screws.

    [i] Use guide pins of video monitor unit to locate the installation position and secure at 4 points (22) with bolts provided.

22. Close video display (20) and remote control storage compartment (21).

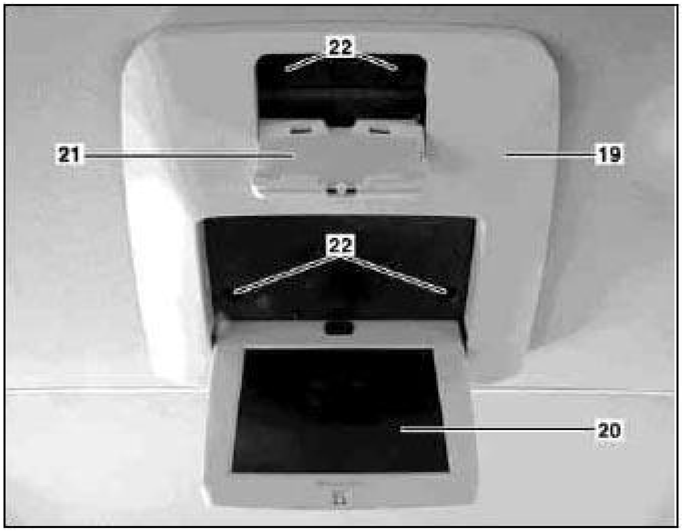


Fig. 281: Identifying Video Display, Video Monitor Unit And Remote Control Storage Compartment

RETROFIT VIDEO SYSTEM MONITOR - AZ82.60-P-0004-02D

Model 163.136 /154 /172 2A as of 145273, Models 163.136 /154 /172 2X as of 708319, Models 163.113/128 /157 /174 /175 2#, except power tilting/sliding roof in glass version, Code 414a

1. Attach adhesive tape from the interior lamps (1) as far as the rear handles.

   i The adhesive tape should have the same width as the interior lamps (1). Use lightly adhering adhesive tape to prevent damage to the headliner.

2. Measure off distance (a) between the rear fastening points of the front handles (23), halve distance and mark on the strips of adhesive tape.

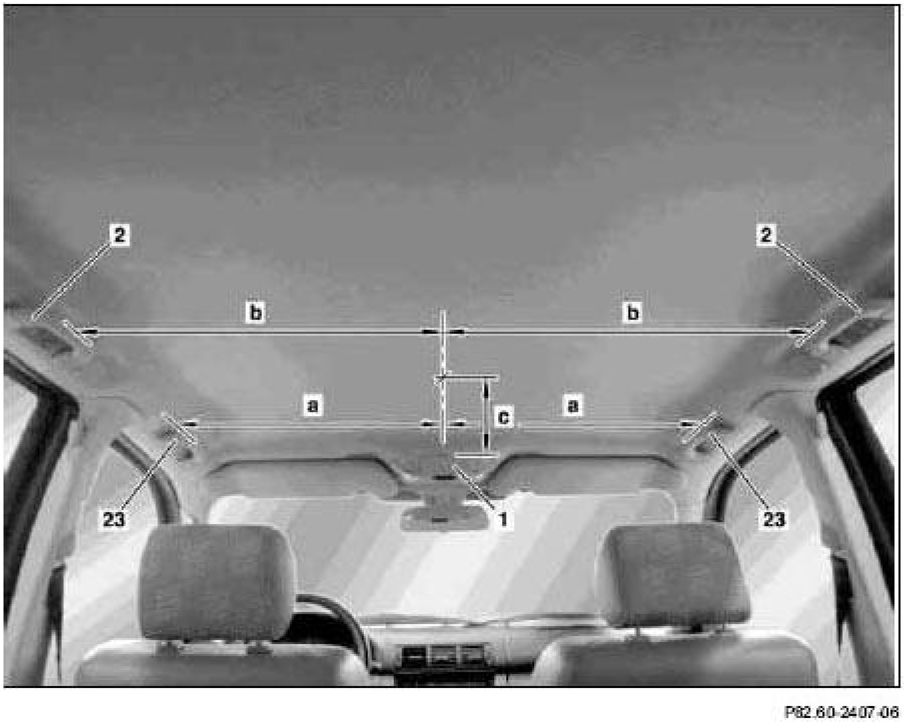


Fig. 282: Identifying Distance (A) Between Rear Fastening Points Of Front Handles

3. Measure off distance (a) between the rear fastening points of the front handles (2), halve distance and mark on the strips of adhesive tape.
4. Join these two marks by a line.
5. Measure from the trailing edge of the interior lamp (1) 340 mm (c) and mark on the center line.

   i This is where the leading edge of the monitor bracket is applied.

6. Align the V-shaped cutout (3) on the rear side of the monitor bracket (4) at the marking on the adhesive tape.

   i The bracket should be at a distance of 340 mm from the interior lamp.

7. Use monitor bracket (4) as template for marking the adhesive tape.

   i Do NOT mark beyond the edge of the template.

   i To mark the adhesive tape, use the rear side of the bracket. Mark headliner at side along the bracket as far as the front incisions (6) and the rear incision (7). Mark inside of the front incision (6) and the rear incision (7)to determine the front and rear edges of the monitor cutout. Complete front and rear mark of the cutout using straightedge.

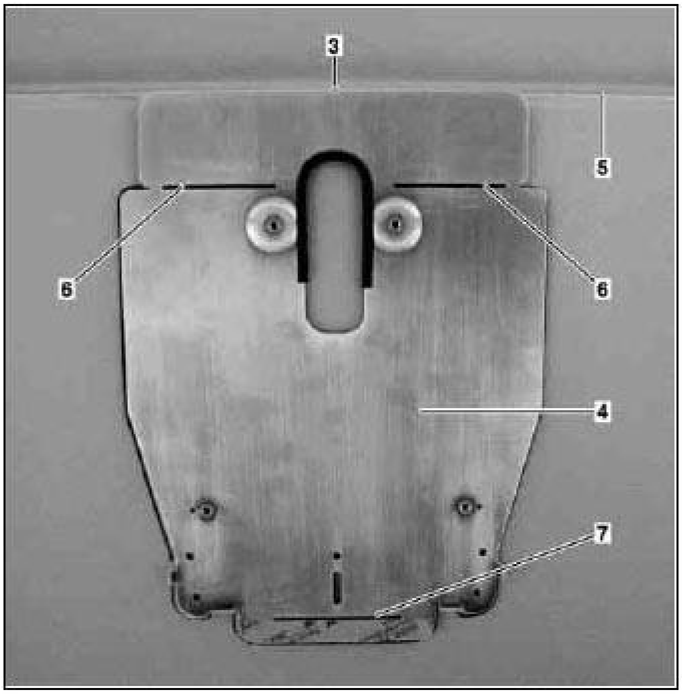


Fig. 283: Identifying V-Shaped Cutout (3) On Rear Side Of Monitor Bracket

8. Remove marked area of the headliner.

   [i] In order not to damage the headliner if the blade slips, cut inward starting from the corners. NEVER remove the cutout until the headliner has been removed completely along the mark.

9. Fasten monitor wiring harness (8) at the white adhesive tape markings using the available clips (9) and the attached, self-adhesive foamed material (10) to the left-hand A-pillar.
10. Route monitor wiring harness at top between the headliner and vehicle roof, next to the shock absorber at the left-hand A-pillar.

    [i] **Carefully** pull headliner downward. Do not tear or bend headliner.

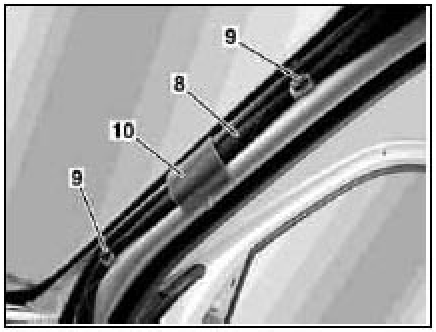


Fig. 284: Identifying Self-Adhesive Foamed Material, Monitor Wiring Harness And Clips

11. Route monitor wiring harness (8) next to the existing wiring harness (11).
12. Route monitor wiring harness in a curve to the monitor cutout in the headliner.

 i Approximately 160 mm of the wiring harness should hang out of the monitor cutout.

13. Secure wiring harness to the headliner using self-adhesive foamed material (12) supplied.

 i **As of VIN A289565, X754620:** Ensure that wiring harness does not affect window airbag function.

 i Route wiring harness as flat as possible.

Headliner shown with tilting/sliding roof

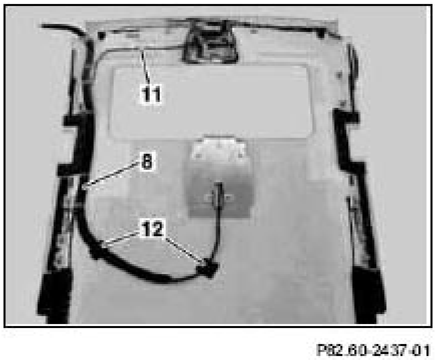


Fig. 285: Identifying Existing Wiring Harness, Monitor Wiring Harness And Self-Adhesive Foamed Material

14. Apply straightedge to the front marking on the adhesive tape and mark both ribs on the crossmember.

 i Use marking (13) to center the monitor bracket.

15. Remove the protective foil from the strip of adhesive tape on the monitor bracket.

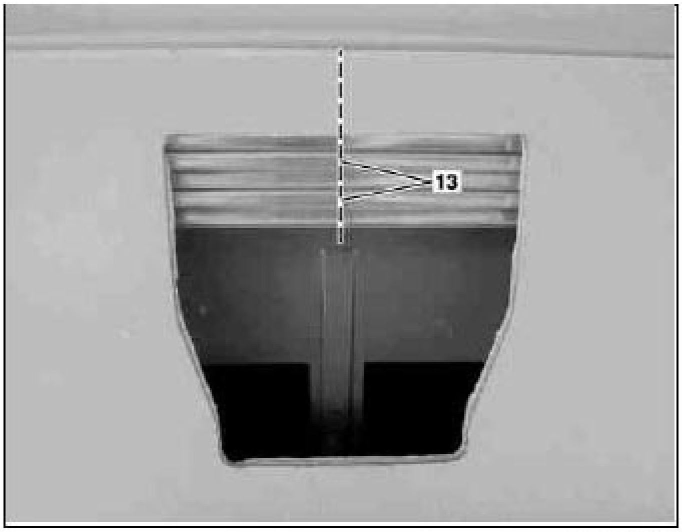


Fig. 286: Identifying Mark On Center Monitor Bracket

16. Adhere bracket to crossmember ribs.

 i Align the center incision (14) of the monitor bracket to the marking on the crossmember (25). Guide lugs (15) of the bracket latch at front in the grooves (26) of the crossmember.

17. Route monitor wiring harness (8) through opening (16) in rear area of bracket.
18. Provide bore hole with Ø = 5 mm through bracket and crossmember.

 i Use guide hole (17) provided in the bracket. To prevent damage to the vehicle roof, limit drilling depth to 5 mm. Cover interior to collect the chips.

19. Rivet bracket with rivet supplied to crossmember of tilting/sliding roof frame.

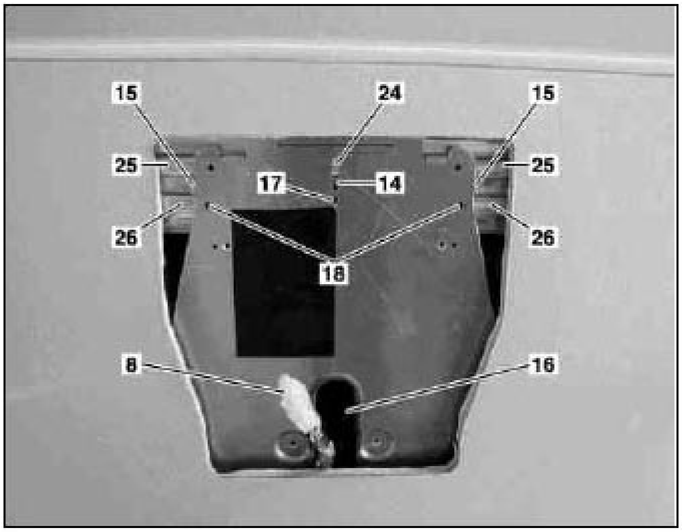


Fig. 287: Identifying Guide Hole, Crossmember And Monitor Wiring Harness

20. Provide two further bore holes with Ø = 5 mm through bracket and crossmember of tilting/sliding roof frame.

    i Use guide holes (18) provided in the bracket. To prevent damage to the vehicle roof, limit drilling depth to 5 mm. Cover interior to collect the chips.

21. Rivet bracket with rivet supplied to crossmember.

    i 2 rivets.

22. Remove adhesive tape from the headliner.
23. Insert monitor wiring harness into video monitor unit (19).
24. Open video display (20) and remote control storage compartment (21).
25. Secure video monitor unit (19) to bracket.

    i Do NOT overtighten mounting screws.

    i Use guide pins of video monitor unit to locate the installation position and secure at 4 points (22) with bolts provided.

26. Close video display (20) and remote control storage compartment.

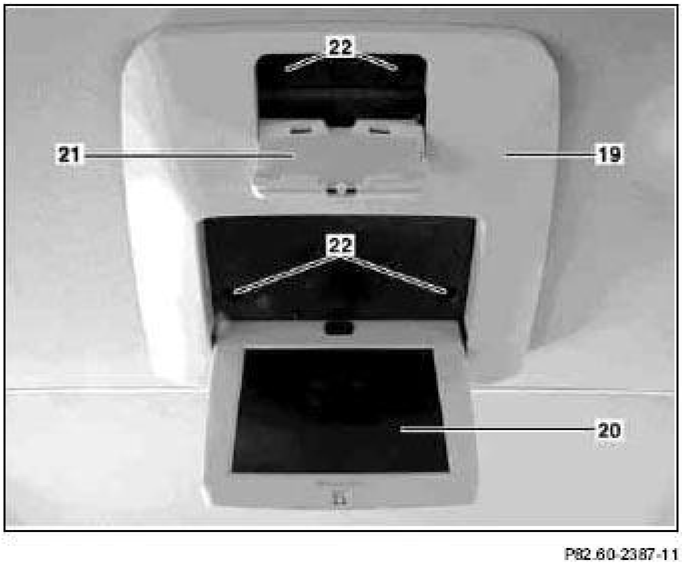


Fig. 288: Identifying Video Display, Video Monitor Unit And Remote Control Storage Compartment

RETROFIT WIRING HARNESS FOR AUXILIARY INTERFACE MODULE AND VIDEO/DVD PLAYER - AZ82.60-P-0004-03A

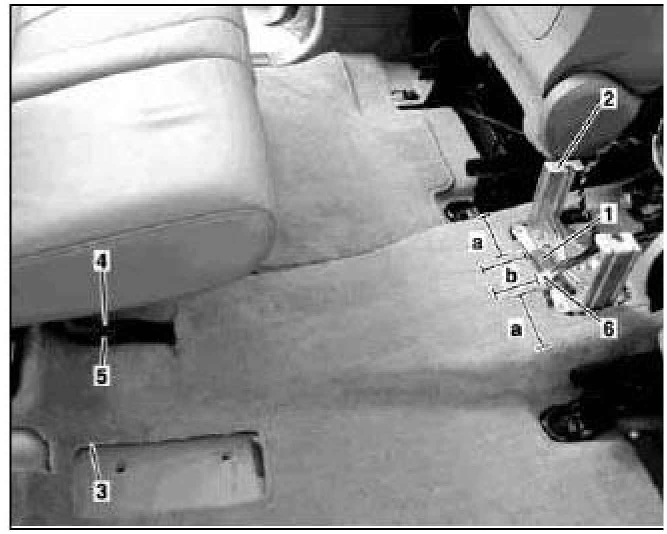
Model 163.113/136 /154 /172 /174 #A as of 145273 289564,

Model 163.113 /136 /154 /172 #X as of 708319 up to 754619

1. Adhere supplied self-adhesive foamed material (1) to rear end of the center console bracket (2).
2. Measure dimension (a) on left and right from the upper edge of the transmission tunnel and mark floor covering.
3. Starting from the transmission tunnel cutout of the floor covering, cut into floor covering 2 times (b).

i Incisions should be located above the recesses in the transmission tunnel.

a 110 mm
b 55 mm

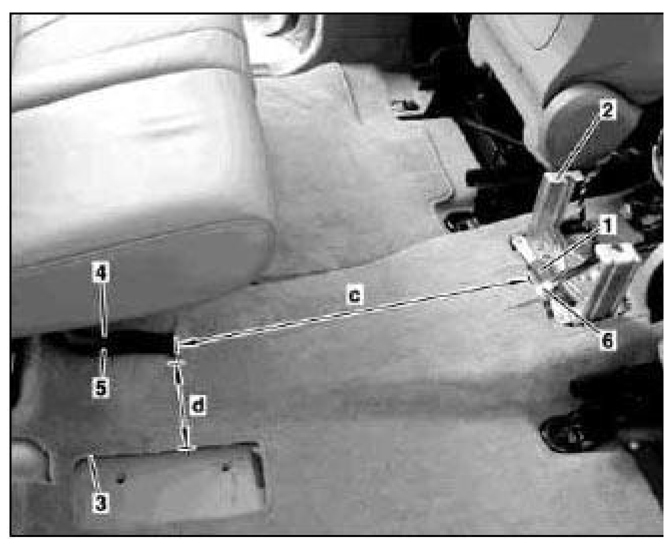


P82.60-2388

Fig. 289: Identifying Dimension (A) On Left And Right From Upper Edge Of Transmission Tunnel

4. From the transmission tunnel cutout of the floor covering measure dimension (c) and from the inner edge of the cutout of the 40 % rear seat (3) measure the dimension (d) and mark floor covering.

c 510 mm
d 120 mm



P82.60-2389

Fig. 290: Identifying Transmission Tunnel Cutout Of Floor Covering Dimension (C)

5. Cut into floor covering toward left-hand side (e).

   [i] Incision should be located in the center of the transmission tunnel.

6. Starting from the center of the previous incision, cut into floor covering toward the rear (f).
7. Guide wiring harness for video player (4) and wiring harness for DVD player (5) from the incision behind

the center console bracket (2) to the cutout for the 40% rear seat (3).

i Leave wiring harness at this point for routing under the floor covering at a later time. Do NOT route wiring harness for the auxiliary interface module under the floor covering.

e	70 mm
f	30 mm

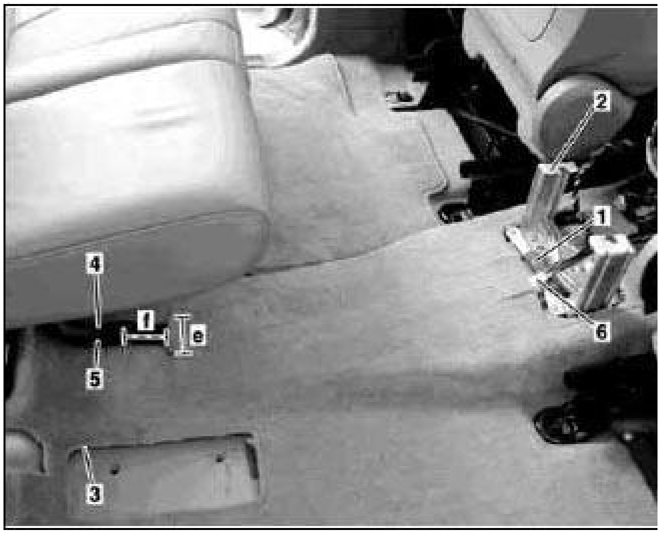


Fig. 291: Identifying Cut Into Floor Covering Toward Left-Hand Side (e)

8. Place wiring harnesses at top on the selector lever module.

   i Ensure that the wiring harnesses remain in this position. This ensures that the wiring harnesses have sufficient play for subsequent installation of the air duct.

9. Guide wiring harness for video player and wiring harness for DVD player to the incision in the floor covering under the 60% rear seat.

   i Wiring harnesses should lie as straight and as flat as possible in the recesses of the transmission tunnel from the center console cutout to the rear incision. White adhesive tape mark (6) should remain at the rear end of the center console bracket (2).

10. Slide tab of the floor covering at the rear incision under wiring harnesses.
11. Install rear air duct (7).

    i 2 bolts at the rear air duct.

12. Route wiring harness for auxiliary interface module (8), wiring harnesses for video and DVD player (9) along the upper side of the air duct (7) and secure using self-adhesive foamed material (10) supplied.

    i Route wiring harnesses as flat as possible.

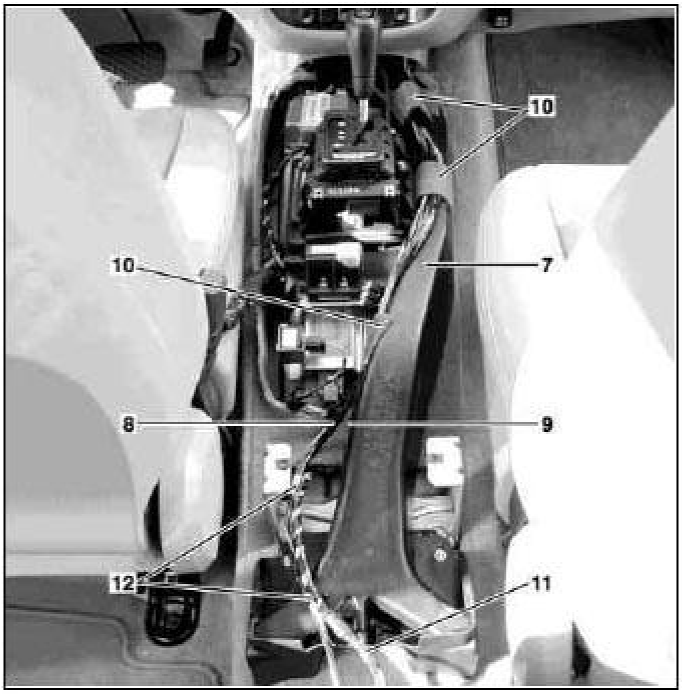


Fig. 292: Identifying Rear Air Duct, Self-Adhesive Foamed Material And Auxiliary Interface Module

13. Secure wiring harness for auxiliary interface module (8) with tie straps (12) to wiring harness of the rear power window (11).

    [i] White adhesive tape marks identify position of the tie straps.

14. Secure video player wiring harness with blue color coding (4) and DVD player wiring harness with red color coding (5) with self-adhesive brackets (13) and tie straps at the 60% rear seat.

    [i] The white strips of adhesive tape on the wiring harness for video player (4) and the red strips of adhesive tape on the wiring harness for DVD player (5) identify the location for the brackets and tie straps.



P82.60-2392-11

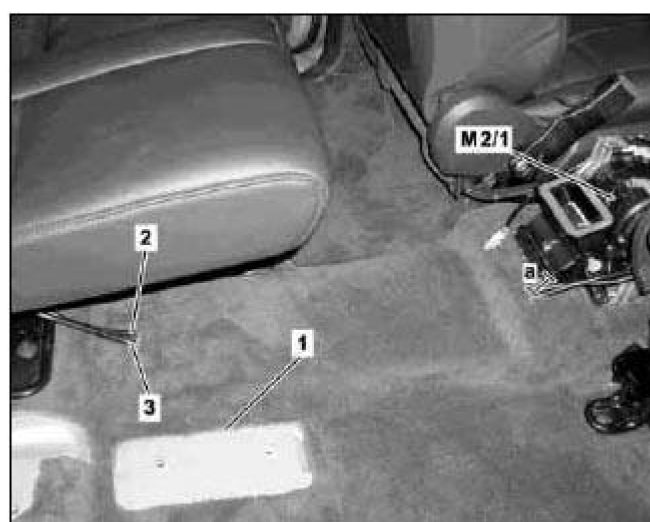
Fig. 293: Identifying Self-Adhesive Brackets, Blue Color Coding And Red Color Coding

RETROFIT WIRING HARNESS FOR AUXILIARY INTERFACE MODULE AND VIDEO/DVD PLAYER - AZ82.60-P-0004-03B

Models 163.113/154/174#A as of 289565, Model 163.113 #X as of 754620, Model 163.128/157/175

1. Make diagonal cut (a=50 mm) to floor lining of right rear corner of rear blower motor (M2/1).

1 Cutout in floor lining, 40% rear seat
2 Wiring harness video player
3 DVD player wiring harness



P82.60-2445

Fig. 294: Identifying Rear Blower Motor, Cutout In Floor Lining And DVD Player Wiring Harness

2. Measure dimension (b=510 mm) from center of rear blower motor (M2/1) and dimension (c=120 mm) from inner edge of cutout in floor lining under the 40% rear seat and mark the floor lining.

1 Cutout in floor lining, 40% rear seat
2 Wiring harness video player
3 DVD player wiring harness

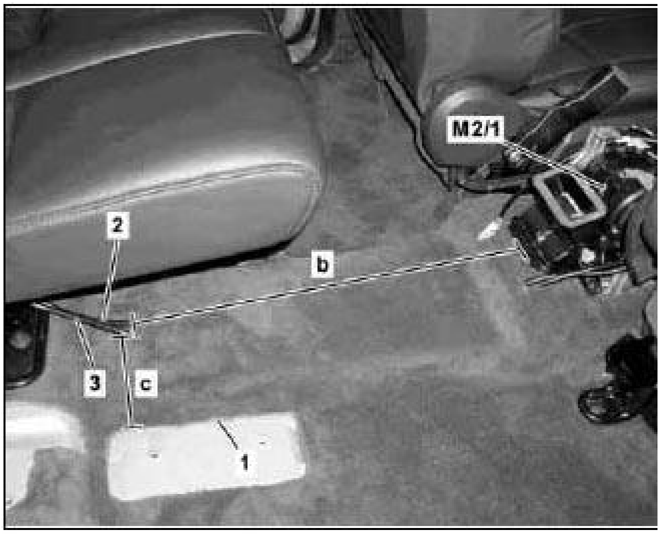


Fig. 295: Identifying Dimension (b=510 mm) From Center Of Rear Blower Motor (M2/1)

3. Starting at the marking cut the floor lining towards the left-hand side of the vehicle (d=70 mm).

   i The incision should be located in the center of the transmission tunnel.

4. Cut floor lining from center of previous incision (d=70 mm) to vehicle rear (e=30 mm).
5. Route wiring harness video player (2) and wiring harness DVD player (3) from the incision to the rear of the rear blower motor (M2/1) to the cutout in the floor lining under the 40% rear seat under the floor lining.

   i Put down wiring harness for later routing.

   Do **not** route wiring harness for additional interface module under the floor lining.

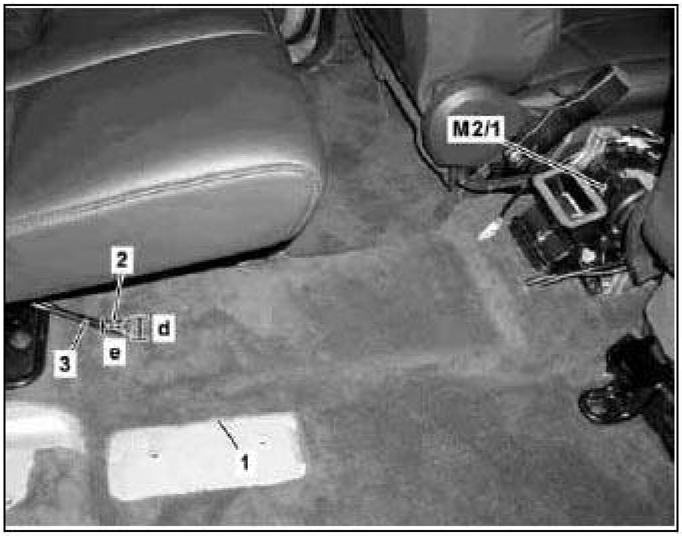


Fig. 296: Identifying Rear Blower Motor And DVD Player Wiring Harness

6. Route wiring harness for additional interface module (4), wiring harness video player (2) and wiring harness DVD player (3) together along the rear air duct (5).
7. Route wiring harness for additional interface module (4) on top side of left-hand junction of rear air duct.
8. Route wiring harness video player (2) and wiring harness DVD player (3) on top side of right-hand junction of rear air duct.
9. Fasten wiring harness to top side of rear air duct (5) with attached, self-adhesive foamed material (6).
10. Fasten video player and DVD player wiring harness to outside of bracket on center console (7) using attached self-adhesive foamed material (6).

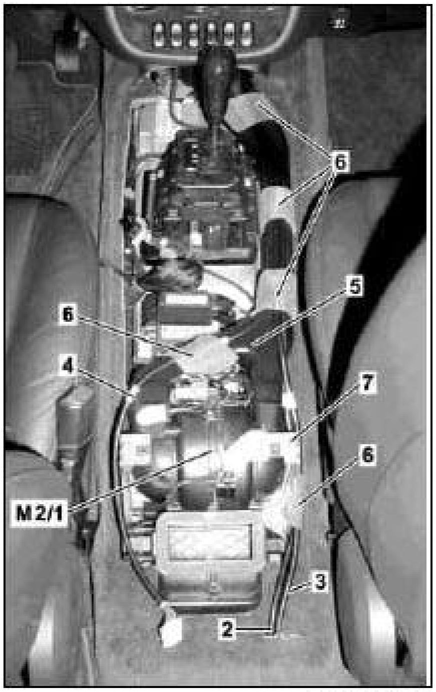


Fig. 297: Identifying Self-Adhesive Foamed Material, Rear Blower Motor And Rear Air Duct

11. Route wiring harness video player (2) and wiring harness DVD player (3) to the cutout below the 60% rear seat and upwards out of the floor lining.

    i The wiring harness must be routed as straight and flat as possible in the recess of the transmission tunnel below the floor lining.

12. Slide any protruding floor lining cutouts under the wiring harnesses.
13. Fasten the blue marked wiring harness video player (2) and the red marked wiring harness DVD player (3) to the seat frame of the 60% rear seat using the attached self-adhesive retaining clips (8) and tie straps.

    i The white adhesive tape marking on the wiring harness video player (2) and the red adhesive tape marking on the wiring harness DVD player (3) represent the positions for the retaining clips and tie straps.



Fig. 298: Identifying Self-Adhesive Retaining Clips And DVD Player Wiring Harness

RETROFIT AUXILIARY INTERFACE MODULE - AZ82.60-P-0004-04A

Model 163.113/136 /154 /172 /174 #A as of 145273 289564,

Model 163.113 /136 /154 /172 #X as of 708319 up to 754619

1. Place center console (1) on workbench.

   ⓘ Ensure that the center console is not damaged or dirty.

2. Remove rear ashtray insert.
3. Open ashtray flap completely.

   ⓘ Press retaining spring (3) downward.

4. Insert auxiliary interface module (4) into ashtray flap (2) and secure with bolts (5).

   ⚠ Do not overtighten bolts.

   ⓘ Previously installed bolts must be removed before installing the auxiliary interface module. Guide wiring harness through lower right corner of the ashtray opening. Guide retaining spring (3) through between board and cover panel.

5. Close ashtray flap.

   ⓘ Press retaining spring (3) downward.



Fig. 299: Identifying Center Console, Auxiliary Interface Module And Retaining Spring

RETROFIT VIDEO PLAYER - AZ82.60-P-0004-05A

Model 163.136 /154 /172 #A as of 145273, Models 163.136 /154 /172 #X as of 708319, Models 163.113/128 /157 /174 /175

Nm **Rear seats**

Number	Designation		Model 163 as of 09/99
BA91.12-P-1005-03A	Nuts for rear seat console on vehicle floor	NM	40
BA91.12-P-1008-03A	Screws for rear seat console on vehicle floor	NM	40

1. Unscrew rear nut (1) and bolt (2) from 60% rear seat.
2. Position bracket (3)and secure with bolt (2) and nut (1) Nm .

   i Insert bolt with Loctite. Replace nut.

3. Install covers under the 60% rear bench.

   i Replace center cover at rear seat bench at bottom with cover from the conversion kit. Do NOT install shade at front at the 60% bench.

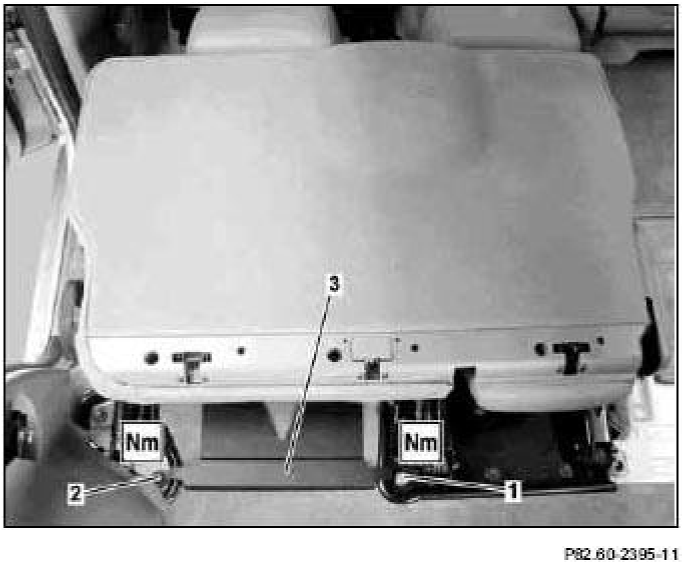


Fig. 300: Identifying Rear Seat Bracket

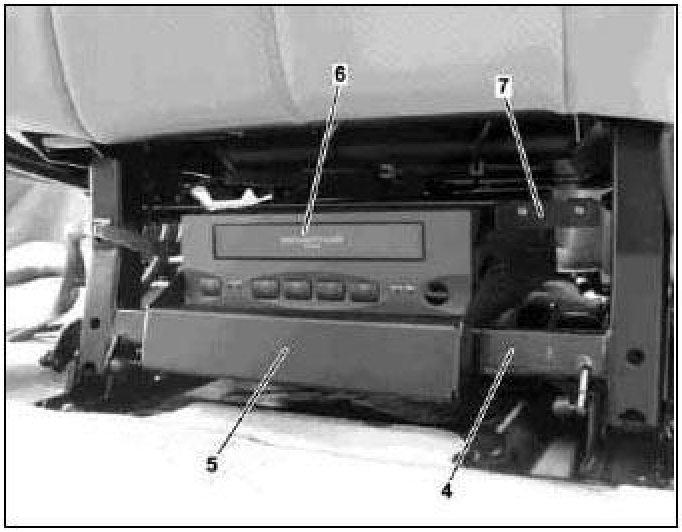
4. Apply transparent protective foil in area of locking arm (5) of video/DVD player to crossmember of seat frame (4).
5. Slide video/DVD player (6) into bracket under the 60% rear seat.

   i Ensure that the guide on the underside of the playback unit is moved into the V-shaped cutout in the bracket.

6. Fold locking arm (5) above seat frame crossmember (4).
7. Install striker (7) for seat adjustment.

   i Before installation ensure that the seat is completely to the rear because after installation adjustment is no longer possible. Striker should be installed approximately 5 mm to the left of the video player, with the flat side facing the video player.

8. Insert corresponding plug, video or DVD, into the playback unit.



P82.60-2396-11

Fig. 301: Identifying Video/DVD Player, Striker And Locking Arm

RETROFIT VOLTAGE SUPPLY FOR CENTRAL INTERFACE MODULE - AZ82.60-P-0004-06A

Model 163.136 /154 /172 #A as of 145273, Models 163.136 /154 /172 #X as of 708319, Models 163.113/128 /157 /174 /175

1. Remove cover for fuse unit in right footwell.

   i Turn arresting mechanisms counterclockwise and move out cover to the rear.

2. Route plug for voltage supply (1) for the interface module of the fuse unit into the glove compartment opening.

   i Guide cable under the right-hand instrument panel support (2).

   View of left-hand steering installation

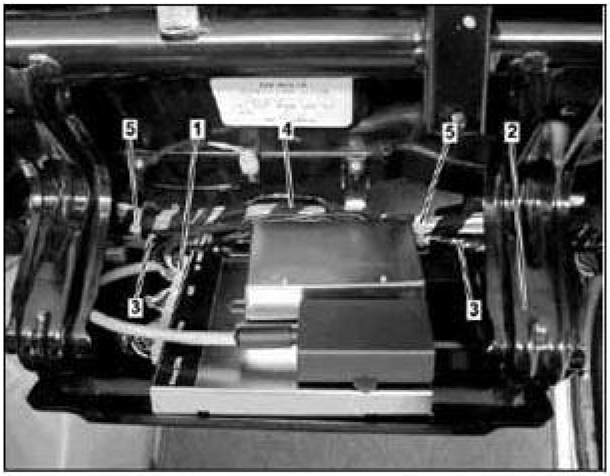


Fig. 302: Identifying Voltage Supply And Instrument Panel Support

3. Insert plug into interface module.

   i Input on interface module marked.

4. Secure all wiring harnesses (3) of the video system to the interior wiring harness (4) with tie straps.

   i Fastening points are marked with white adhesive tape on the wiring harnesses.

5. Disconnect connector in the voltage supply cable (11) from the relay module.
6. Insert noise filter (12) into the voltage supply cable (11).
7. Secure noise filter (12) under the right-hand instrument panel support with tie straps.

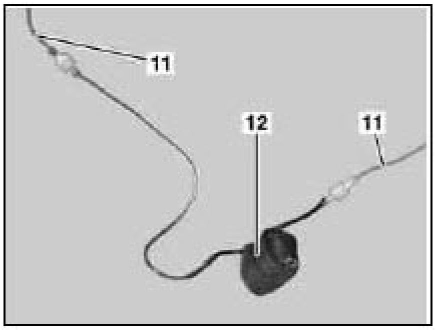


Fig. 303: Identifying Noise Filter And Voltage Supply Cable

8. Install fuse holder (6) of the voltage supply cable in position f9 of the fuse unit (7).
9. Insert 7.5 A fuse supplied into fuse holder.

Only on vehicles on which running boards are not installed

10.
    1. Insert red relay module (8) for power supply cable in position 7 in fuse unit (7).

       Only on vehicles on which running boards are installed

    2. Remove cable and fuse from **red** relay module (8) and install in free locations of present **red** replay module in position 7 of fuse unit (7).
11. Insert attached 10 A fuse into fuse holder with voltage supply cable.
12. Unscrew nut (9) at terminal 31.

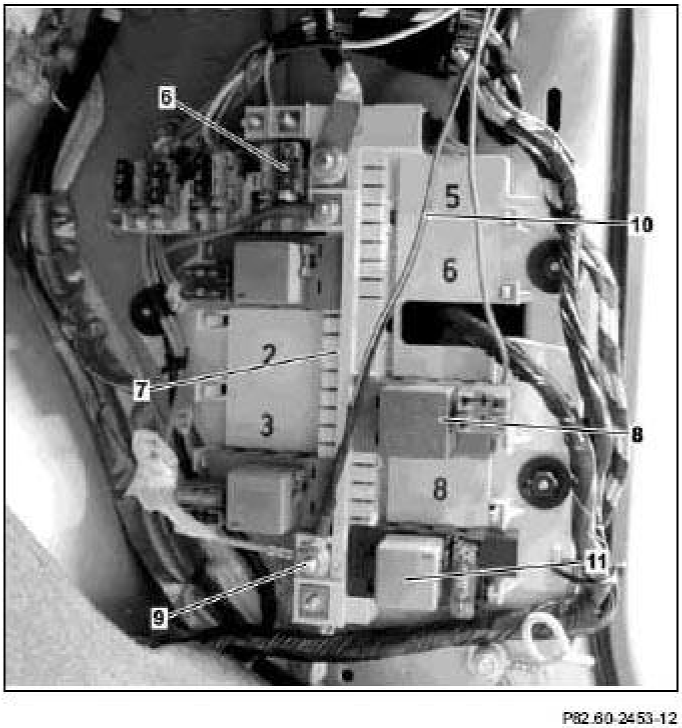


Fig. 304: Identifying Fuse Holder, Red Relay Module And Black Relay Module

13. Connect ground cable (10) of the interface module wiring harness to terminal 31.
14. Install nut (9) on terminal 31.
15.
    1. Insert**black** relay module (11) into location 9 of fuse unit (7).

       i Only if relay is not yet present.

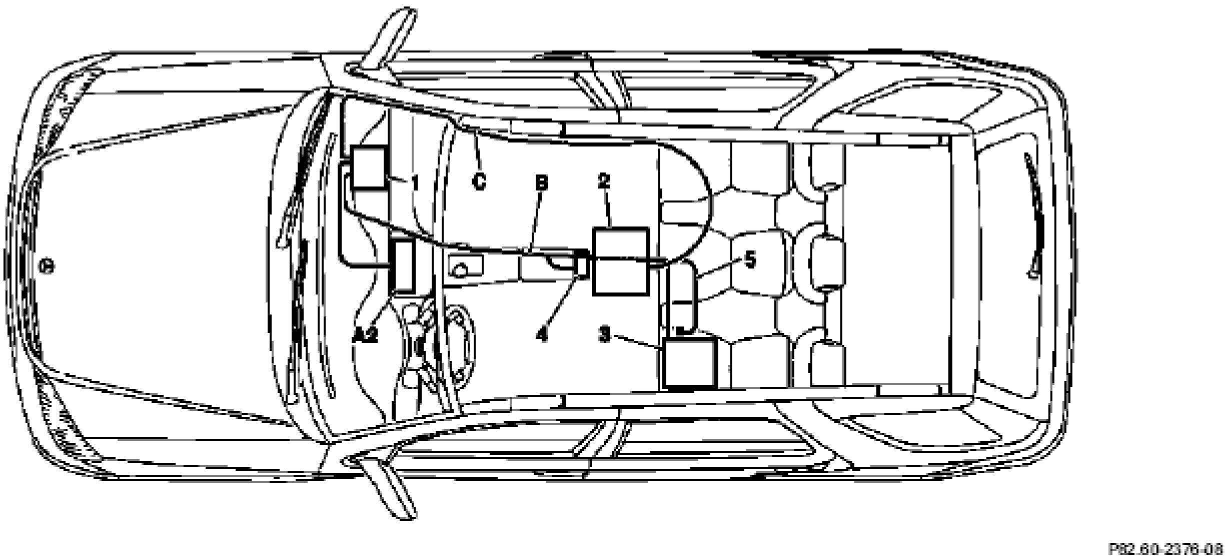
16. Install fuse unit cover in right-side footwell.

RETROFIT VEHICLE VIDEO SYSTEM - AZ82.60-P-0004A

MODELS 163.136 /154 /172 1A as of 145273, 163.136 /154 /172 1X as of 708319,

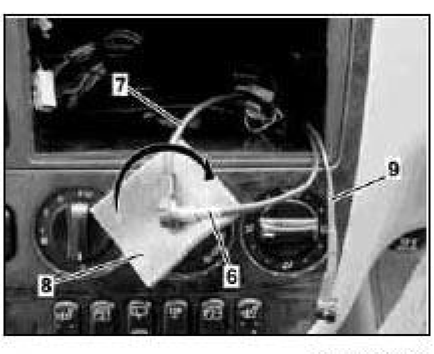
163.113 /128 /157 /174 /175 1#

left hand drive vehicle



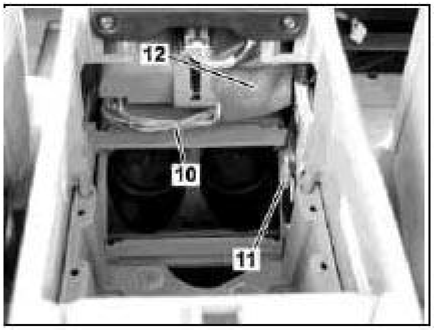
1	Central interface module	4	Auxiliary interface module	B	Video/DVD player wiring harness
2	Video monitor	5	DVD player wiring harness	C	Wiring harness for video monitor
3	Video player	A2	Radio		

Fig. 305: Identifying Vehicle Video System Components



6	Antenna cable for FM modulator
7	Vehicle antenna cable
8	Self-adhesive foamed material
9	Antenna cable for FM modulator

Fig. 306: Identifying Vehicle Antenna Cable And Self-Adhesive Foamed Material



P82.60-2400-01

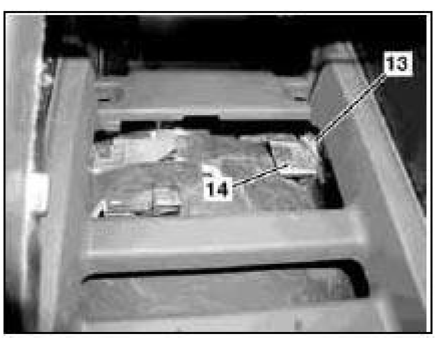
Illustrated up to VIN A289564, X754619

10 *Wiring harness for auxiliary interface module*

11 *Clip*

12 *Self-adhesive foamed material*

Fig. 307: Identifying Wiring Harness For Auxiliary Interface Module And Clip



P82.60-2444-01

Illustrated as of VIN A289565, X754620

13 *Auxiliary interface module connector*

14 *Mount for center console*

Fig. 308: Identifying Auxiliary Interface Module Connector And Mount For Center Console

	Remove		
1 AR	Remove center console Remove/install center console		**AR68.20-P-2000GH**
2	Remove center console insulating mat		
3	Remove rear air duct	i Up to VIN A289564, X754619. 2 screws at rear air duct.	
4 AR	Remove radio (A2) Remove/install radio		**AR82.60-P-7502EA**
5	Remove glove compartment		

AR	Remove/install glove compartment	Torx bit set	**AR68.10-P-1400GI** **Fig. 309**
6	Loosen upper section of right front door rubber seal		
7 AR	Remove A-pillar paneling on right Remove/install paneling on A-pillar	Long wedge	**AR68.30-P-4050GH** **Fig. 155**
8 AR	Remove right sun visor Remove/install sun visor		**AR68.60-P-5480GH**
9	Remove right front handle	i Open covers for handles, press down clip on each side of handle, at the same time press handle upward and pull out.	
10	Remove edge guard for tilting/sliding roof cutout		
11	Release upper right B-pillar paneling		
12 AR	Remove covers at lower rear seat Remove and install cover on bottom of rear seat	i Do NOT remove center cover for lower 40% seat. Do NOT reinstall curtain on 60% front bench seat.	**AR91.12-P-1100GH**
13	Release side shade at the 60% bench	i Fold shade upward so that the working area is not obstructed.	
14 AR	Remove 40% rear seat Remove and install bench	Torx bit set	**AR91.12-P-1010GI** **Fig. 309**
	Install		
15	Retrofit central interface module (1)		**AZ82.60-P-0004-01A**
16	Insert antenna cable for FM modulator (6) into vehicle antenna cable (7)		
17	Cover connector with self-adhesive foamed		

	material (8)		
18	Plug remaining antenna cable of FM modulator (9) into radio		
19 AR	Install radio (A2) Remove/install radio		**AR82.60-P-7502EA**
20	Retrofit video monitor (2) and wiring harness of video monitor (C)	i **With** glass version of electric sliding/tilting roof, code 414a. i **Except** glass version of electric sliding/ tilting roof, code 414a.	**AZ82.60-P-0004-02A** **AZ82.60-P-0004-02B**
21	Secure upper right B-pillar paneling	i Ensure that the lugs of the seat belt height adjustment are located correctly in the recess clearance of the paneling.	
22	Install right front handle		
23 AR	Install right sun visor Remove/install sun visor		**AR68.60-P-5480GH**
24 AR	Install right front A-pillar cover Remove/install paneling on A-pillar		**AR68.30-P-4050GH**
25	Re-secure upper area of rubber door seal		
26	Route wiring harness of video/DVD player (B), additional interface module (4) and wiring harness of video monitor (C) later	i Up to VIN A289564, X754619. i As of VIN A289565, X754620.	**AZ82.60-P-0004-03A** **AZ82.60-P-0004-03B**
27	Retrofit auxiliary interface module (4) in center console	i Up to VIN A289564, X754619. i As of VIN A289565, X754620.	**AZ82.60-P-0004-04A** AZ82.60-P-0004-04B
28	Install center console insulating mat		
29 AR	Install center console Remove/install center console		**AR68.20-P-2000GH**

30.1	Plug in plug of additional interface module and secure the wiring harness of the additional interface module (10) to the clip (11) together with the wiring harness of the rear power windows in the center console	i Up to VIN A289564, X754619.	
30.2	Insert auxiliary interface module (13) connector and route between center console mount (14) and center console.	i As of VIN A289565, X754620.	
31.1	Secure auxiliary interface module plug in the left rear corner of the ashtray housing using self-adhesive foamed material (12)	i Up to VIN A289564, X754619.	
32	Open ashtray and cup holder and close to check correct function		
33	Attach side shade of the 60% bench		
34.1	Retrofit video player (3)	Nm Nm	**AZ82.60-P-0004-05A** ***BA91.12-P-1005-03A** BA91.12-P-1008-03A
34.2	Retrofit DVD player		AZ82.60-P-0005-01GH
35 AR	Install 40% rear seat Remove and install bench	Torx bit set	**AR91.12-P-1010GI** **Fig. 309**
36 AR	Install remaining covers under rear seat bench Remove and install cover on bottom of rear seat i	Replace cover under rear seat bench at rear with cover from the conversion kit.	**AR91.12-P-1100GH**
37 AR	Disconnect ground lead from battery Disconnect ground lead from battery		**AR54.10-P-0003A**
38	Retrofit voltage supply for central interface module (1)		**AZ82.60-P-0004-06A**

39 AR	Install glove compartment Remove/install glove compartment	 Torx bit set	 **AR68.10-P-1400GI** **Fig. 309**
40 AR	Connect ground cable for battery Disconnect ground lead from battery		 **AR54.10-P-0003A**
41.1	Initialize DVD player	As of VIN A289565, X754620.	AZ82.60-P-0004-07GH

Rear seats

Number	Designation		Model 163 as of 09/99
BA91.12-P-1005-03A	Nuts for rear seat console on vehicle floor	NM	40
BA91.12-P-1008-03A	Screws for rear seat console on vehicle floor	NM	40

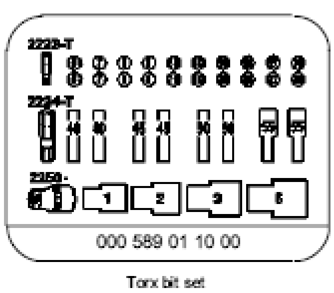


Fig. 309: Identifying Torx Bit Set (000 589 01 10 00)

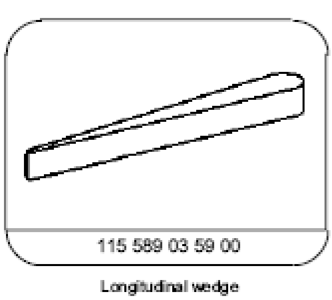


Fig. 310: Identifying Longitudinal Wedge (115 589 03 59 00)

Parts ordering notes

Part no.	Designation	Quantity
B6 782 6500	Monitor, anthracite/orion, with 2 earphones (NTSC)	1

B6 782 6501	Monitor, java, with 2 earphones (NTSC)	1
B6 782 6505	DVD player (national code 1), with bracket	1
B6 782 6506	Video player (NTSC), with bracket	1
B6 782 6507	Earphones (NTSC)	1
B6 782 6508	Radio-controlled earphones (NTSC)	1
B6 782 6530	Floor covering at bottom of rear seat, orion (only with video player) (NTSC)	1
B6 782 6531	Floor covering at bottom of rear seat, anthracite (only with video player) (NTSC)	1
B6 782 6532	Floor covering at bottom of rear seat, Java (only with video player) (NTSC)	1
B6 782 6536	Monitor, anthracite/orion, with 2 earphones (PAL)	1
B6 782 6537	Monitor, java, with 2 earphones (PAL)	1
B6 782 6538	DVD player (national code 2), with bracket	1
B6 782 6539	Video player (PAL), with bracket	1
B6 782 6540	Floor covering at bottom of rear seat, orion (only with video player) (PAL)	1
B6 782 6541	Floor covering at bottom of rear seat, anthracite (only with video player) (PAL)	1
B6 782 6542	Floor covering at bottom of rear seat, Java (only with video player) (PAL)	1
B6 782 6545	Earphones (PAL)	1
B6 782 6551	Central interface module	1
B6 782 6570	Supplementary kit as of VIN A289565, X754620 (PAL)	1
B6 782 6571	Supplementary kit as of VIN A289565, X754620 (NTSC)	1

RETROFITTING TRAFFICSTAR RADIO AND NAVIGATION SYSTEM - AZ82.61-P-0001-02G

Model 163

System illustration

2	Standard wiring harness for N78 transfer case control module
4	TrafficStar wiring harness
5	CAN bus adapter
6	CAN bus lead
8	CAN bus adapter connector
9	CAN bus wiring harness
A	Radio connector
C1	Yellow sound connector
C3	Blue GPS antenna connector
N78	Transfer case control module

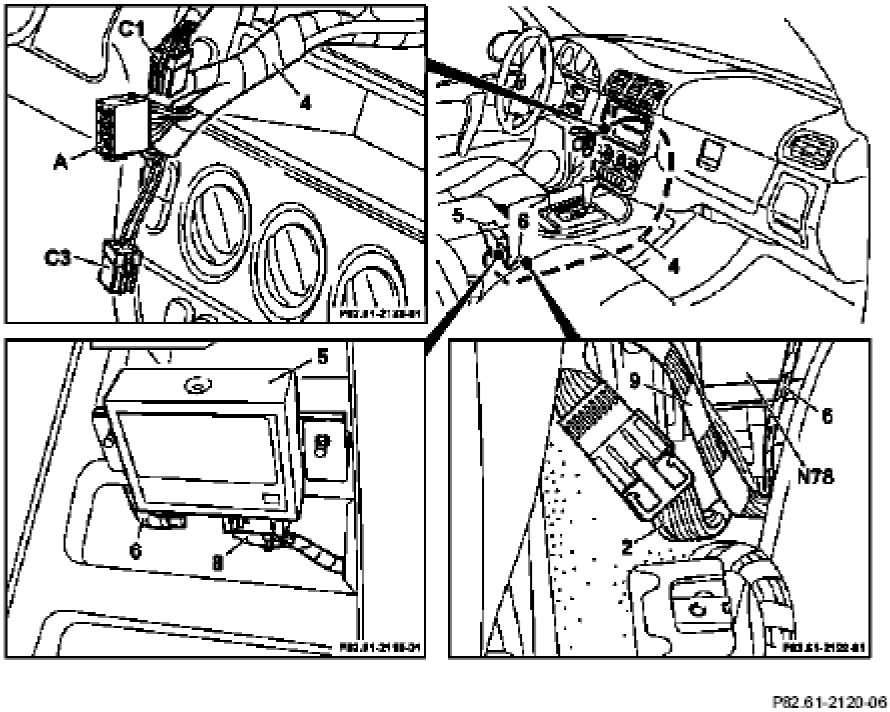


Fig. 311: Identifying Trafficstar Radio And Navigation System Components

TrafficStar wiring harness with sound

4	TrafficStar wiring harness
7	A2 radio connector socket
8	CAN bus adapter connector
A	Radio connector
br	Brown wire (ground, GPS antenna)
C1	Yellow sound connector
sw	Black wire (circuit 15, GPS antenna)
Y	Telephone connector (not required)

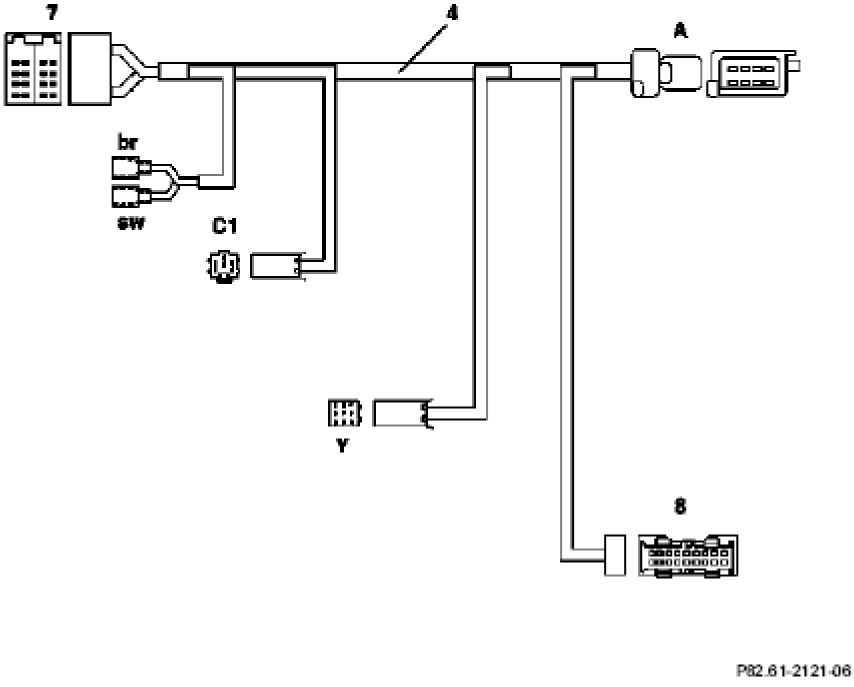


Fig. 312: Identifying Trafficstar Wiring Harness With Sound

1. Position CAN bus adapter (5) in center of center console strut and mark holes (b).
2. Drill holes (b) with 6.2 mm dia. bit.

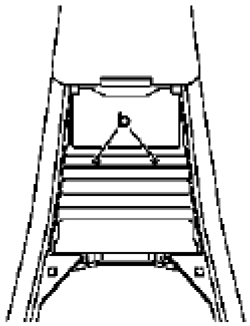


Fig. 313: Identifying Mark Holes

3. Fasten CAN bus adapter (5) to center console strut with two self-tapping screws (a) from parts kit.

   ⓘ Screw screws through strut from below into CAN bus adapter mount.

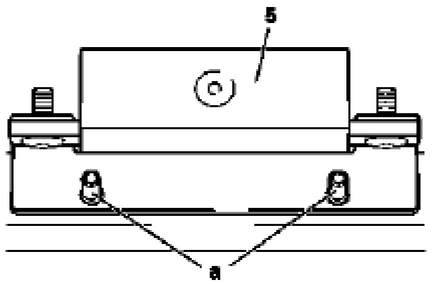


Fig. 314: Identifying CAN Bus Adapter And Self-Tapping Screws

4. Disconnect standard wiring harness (2) from transfer case control module (N78).
5. Connect CAN bus (9) standard wiring harness between transfer case control module (N78) and standard wiring harness (2).
6. Route CAN bus (6) lead on fan duct.

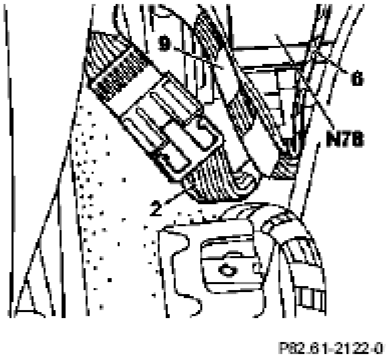


Fig. 315: Identifying Transfer Case Control Module And CAN Bus Wiring Harness

7. Route connector (8) for TrafficStar wiring harness (4) from radio shaft along fan duct to center console.

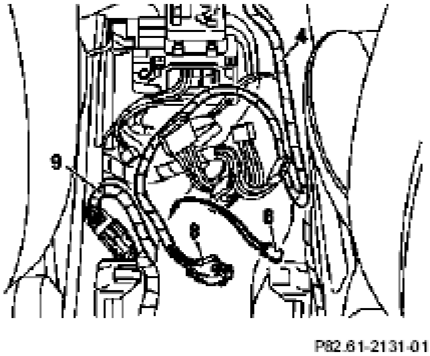


Fig. 316: Identifying Trafficstar Wiring Harness And Connector

Steps 8-11 apply only for vehicles with manual transmission

8. Separate green lead (gn) from CAN bus adapter connector (8) (see magnifying glass).
9. Tie TrafficStar (4) wiring harness on at height of shift gate and pull out green lead (gn).

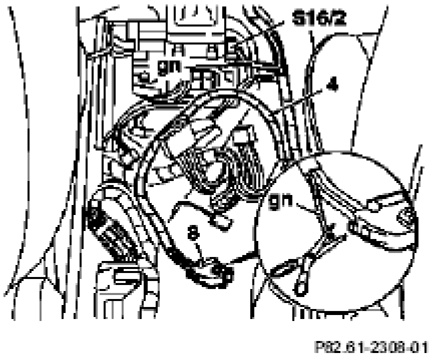
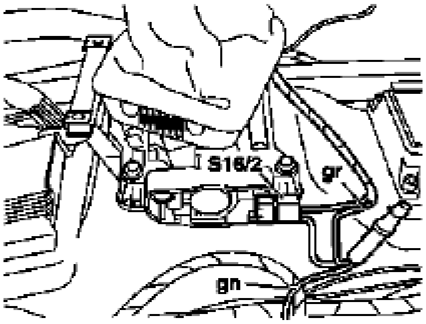


Fig. 317: Identifying CAN Bus Adapter Connector And Trafficstar Wiring Harness

10. Route green lead (gn) to back-up lamp switch (S16/2).

11. Connect lower gray lead (gr) from connector with assignment 2 for back-up lamp switch (S16/2) to green lead (gn) using solder connector.

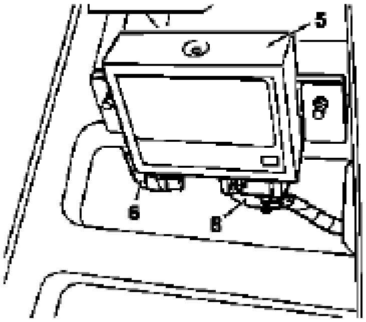
    The connector for the back-up lamp switch (S16/2) has two gray leads, the lower of the two leads is for the switched back-up lamp signal.



P82.61-2309-01

Fig. 318: Identifying Back-Up Lamp Switch And Green Lead

12. Connect connector (8) and lead (6) to CAN bus adapter (5).
13. Install center console.



P82.61-2115-01

Fig. 319: Identifying CAN Bus Adapter And Lead

14. Connect brown and black wire (br, sw) from GPS antenna lead (3) with brown and black lead (br, sw) from TrafficStar wiring harness (4) and slide flat plug insulations together.
15. Attach flat plug connectors and GPS antenna lead (3) to TrafficStar wiring harness (4) with felt.

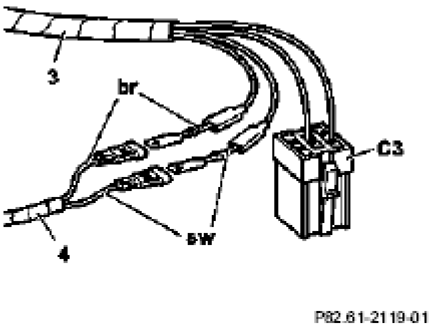


Fig. 320: Identifying GPS Antenna Connector And GPS Antenna Lead

16. Install counter plug (7) from TrafficStar wiring harness (4) to radio connector (A2) and wrap with felt (c).

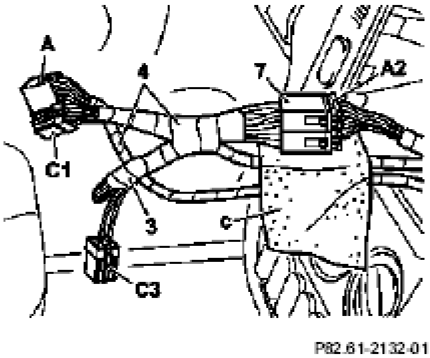


Fig. 321: Identifying Radio Connector And Counter Plug

17. Plug radio connector (A) and yellow sound connector (C1) as well as blue GPS antenna connector (C3) from TrafficStar wiring harness (4) into TrafficStar radio and navigation system (1).
18. Connect radio antenna.
19. Install TrafficStar (1) radio and navigation system.

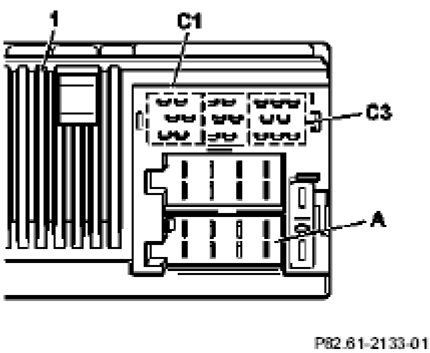
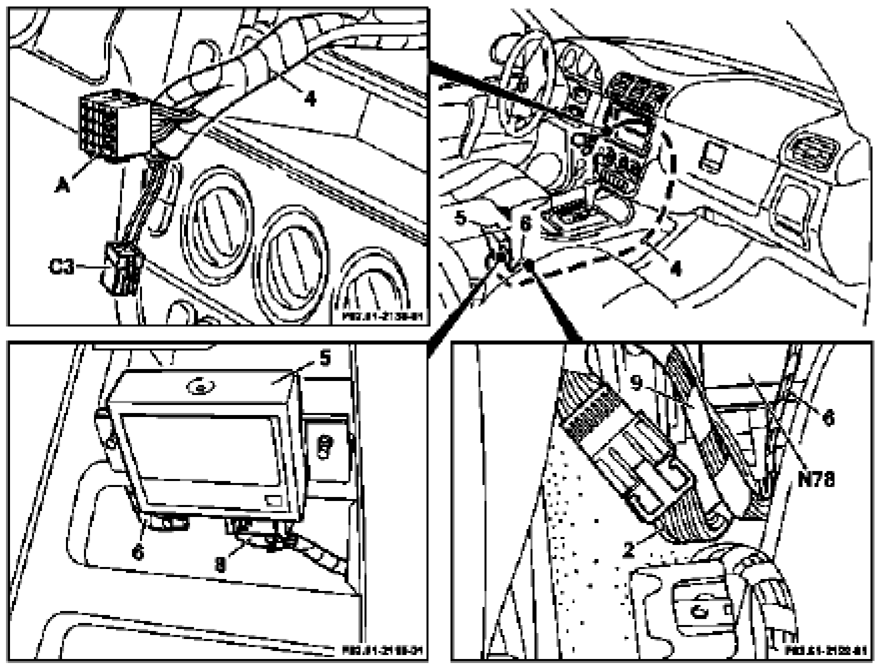


Fig. 322: Identifying GPS Antenna Connector And Sound Connector

Model 163

System illustration

2	*Standard wiring harness for N78 transfer case control module*
4	*TrafficStar wiring harness*
5	*CAN bus adapter*
6	*CAN bus lead*
8	*CAN bus adapter connector*
9	*CAN bus wiring harness*
A	*Radio connector*
C3	*Blue GPS antenna connector*
N78	*Transfer case control module*



P82.61-2136-06

Fig. 323: Identifying Trafficstar Radio And Navigation System Components

TrafficStar wiring harness without sound

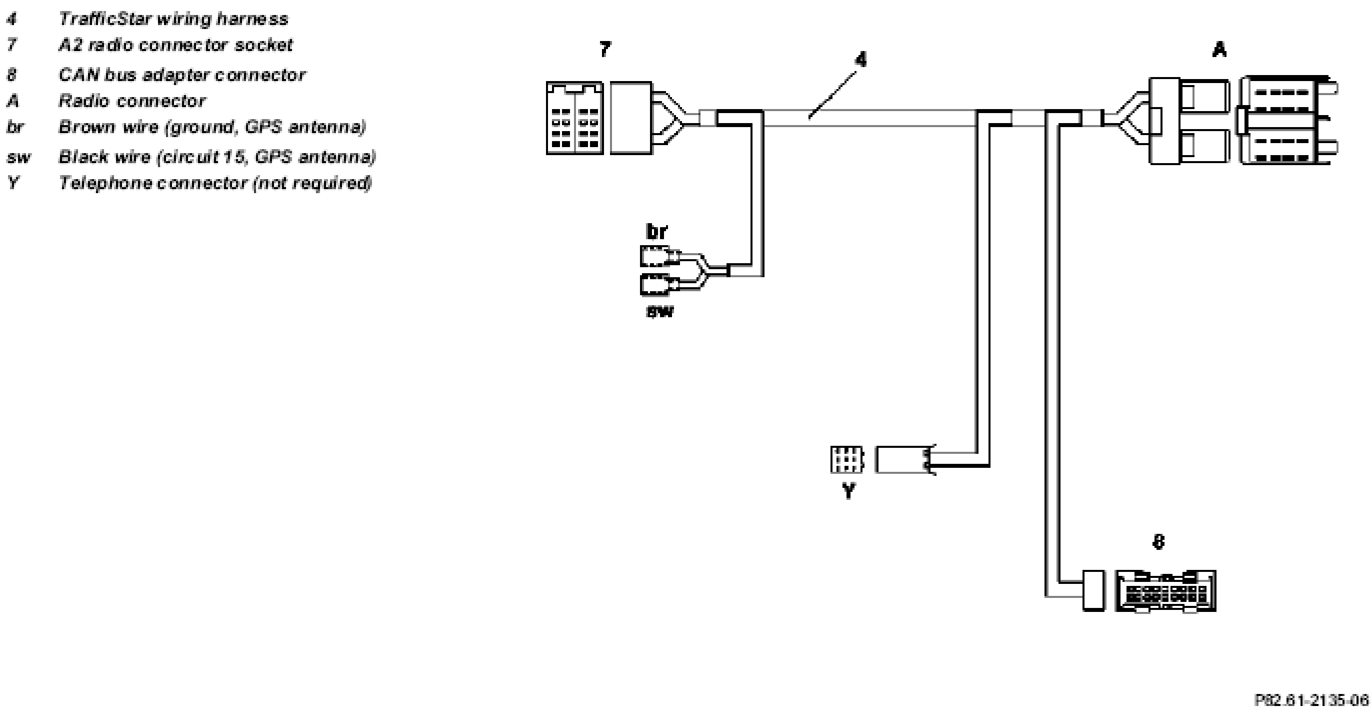


Fig. 324: Identifying Trafficstar Wiring Harness With Sound

1. Position CAN bus adapter (5) in center of center console strut and mark holes (b).
2. Drill holes (b) with 6.2 mm dia. bit.

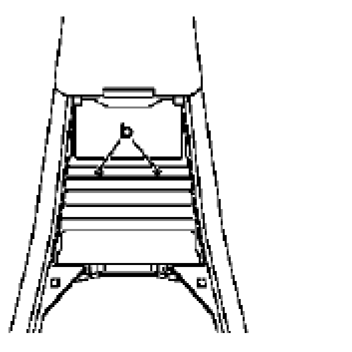


Fig. 325: Identifying Mark Holes

3. Fasten CAN bus adapter (5) to center console strut with two self-tapping screws (a) from parts kit.

   [i] Screw screws through strut from below into CAN bus adapter mount.

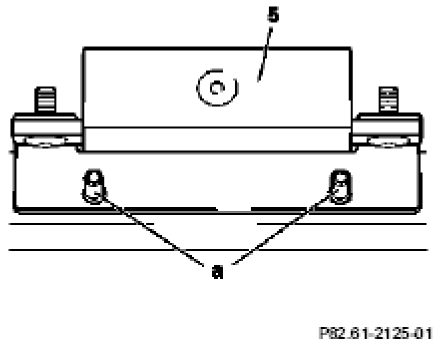


Fig. 326: Identifying CAN Bus Adapter And Self-Tapping Screws

4. Disconnect standard wiring harness (2) from transfer case control module (N78).
5. Connect CAN bus (9) wiring harness between transfer case control module (N78) and standard wiring harness (2).
6. Route CAN bus (6) lead on fan duct.

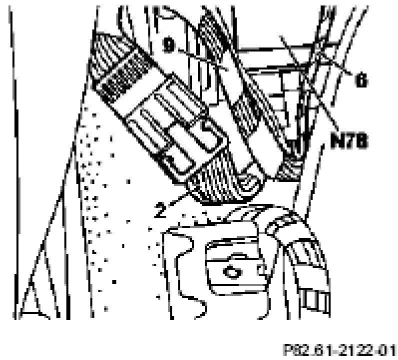


Fig. 327: Identifying Transfer Case Control Module And CAN Bus Wiring Harness

7. Route connector (8) for TrafficStar wiring harness (4) from radio shaft along fan duct to center console.

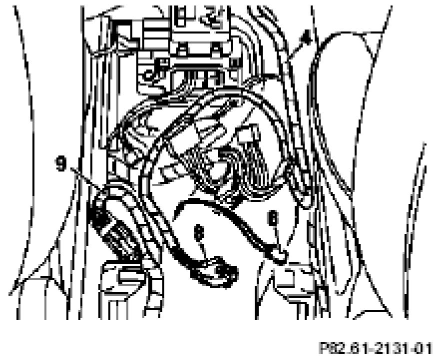


Fig. 328: Identifying Trafficstar Wiring Harness And Connector

Steps 8-10 apply only for vehicles with manual transmission

8. Separate green lead (gn) from CAN bus adapter connector (8).
9. Tie TrafficStar (4) wiring harness on at height of shift gate and pull out green lead (gn).

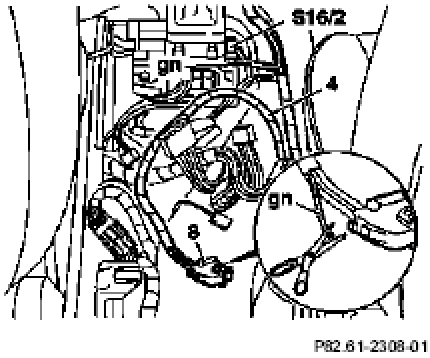


Fig. 329: Identifying CAN Bus Adapter Connector And Trafficstar Wiring Harness

10. Route green lead (gn) to back-up lamp switch (S16/2).
11. Connect lower gray lead (gr) from connector with assignment 2 for back-up lamp switch (S16/2) to green lead (gn) using solder connector.

   [i] The connector for the back-up lamp switch (S16/2) has two gray leads, the lower of the two leads is for the switched back-up lamp signal.

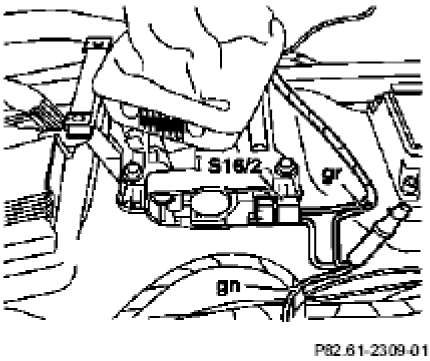


Fig. 330: Identifying Back-Up Lamp Switch And Green Lead

12. Connect connector (8) and lead (6) to CAN bus adapter (5).
13. Install center console.

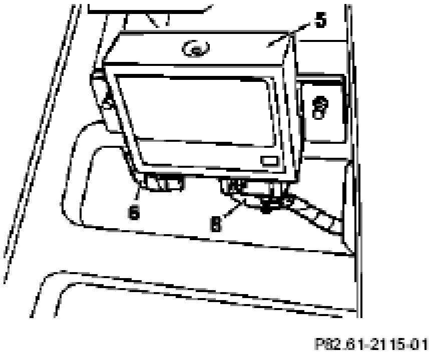


Fig. 331: Identifying CAN Bus Adapter And Lead

14. Connect brown and black wire (br, sw) from GPS antenna lead (3) with brown and black lead (br, sw) from TrafficStar wiring harness (4) and slide flat plug insulations together.
15. Attach flat plug connectors and GPS antenna lead (3) to TrafficStar wiring harness (4) with felt.

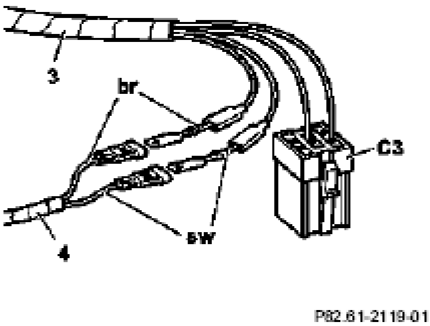


Fig. 332: Identifying GPS Antenna Connector And GPS Antenna Lead

16. Install counter plug (7) from TrafficStar wiring harness (4) to radio connector (A2) and wrap with felt (c).

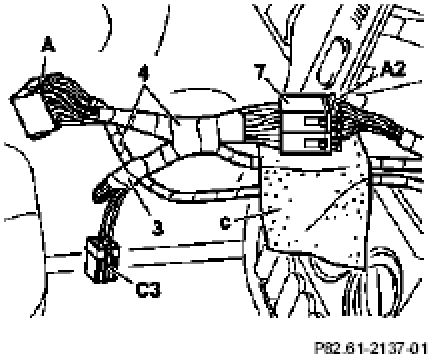


Fig. 333: Identifying Radio Connector And Counter Plug

17. Connect radio connector (A) and GPS antenna connector (C3) with TrafficStar radio and navigation system (1).
18. Connect radio antenna.

19. Install TrafficStar (1) radio and navigation system.

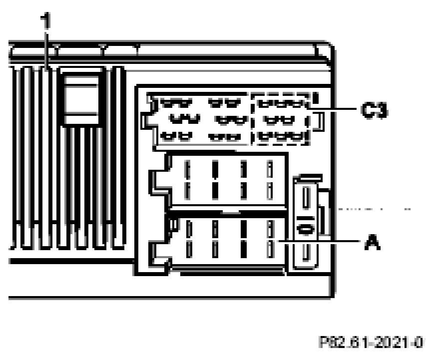


Fig. 334: Identifying GPS Antenna Connector And Sound Connector

CARRYING OUT START-UP AND FUNCTION CHECK - AZ82.61-P-0001-04A

Models 129, 140, 163, 168, 170, 202, 208, 210

System description

1	TrafficStar display field
A	Automatic button
GHI	Multifunction button
M	Mode button
MNO	Multifunction button
←	Multifunction button
*	Multifunction button

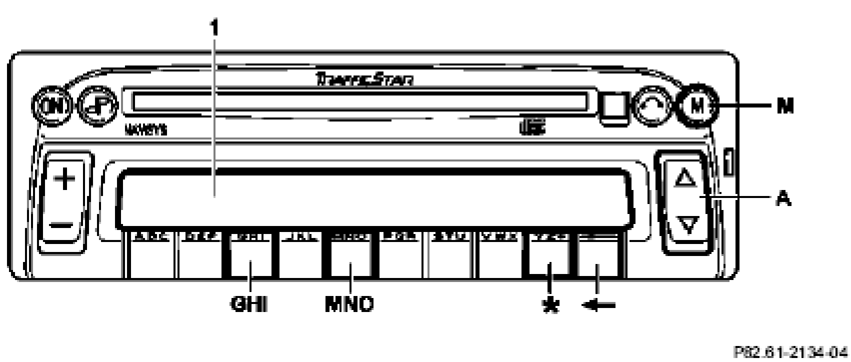


Fig. 335: Identifying Trafficstar Display Field, Automatic Button And Mode Button

[i] Step 5 for initial start-up only applies for equipment which has already been installed in a vehicle and on which initial calibration has been performed.

	Start-up step	Entry with TrafficStar keys	Feedback on TrafficStar display field
1	Start engine		
2	Switch on TrafficStar	Enter code (see CODE card) with multifunction buttons below the numbers on the display field.	**CODE 1 2 3 4 5 6 7 8**
3	Insert navigation CD into TrafficStar	Loading time approx. 1 min.	

4	Activate service mode	Press mode button (M) repeatedly until **NAVIGATE** appears	**NAVIGATE**
		Press automatic button (A) repeatedly until **CONFIG** appears	**CONFIG 1 2 3 4 5 6 7 8***
		Confirm **CONFIG** with multifunction button below (*)	**SYSTEM 1 2 3 4 5 6 7 8***
		Confirm **SYSTEM** with multifunction button (GHI) and (MNO)	**MODULE ***
5	Erase initial calibration	**Applies only when initial calibration has been performed on the unit**	
		Press automatic button (A) repeatedly until **NEW CAL** appears	**NEW CAL ***
		Confirm **NEW CAL** with multifunction button below (*)	**CAUTION CALIBRATION WILL BE ERASED**
		Hold multifunction button below (*) depressed until the following message appears **Initial calibration is then erased and the unit can be recalibrated.**	**CALIBRATION ERASED**
		Press multifunction button (<--)	**NEW CAL ***
		Press automatic button (A) repeatedly until **MODUL T** appears	**MODULE T ***
6	Perform module test	Confirm **MODUL T** with multifunction button below (*) Press multifunction button (<--)	**MODULE OK MODULE T ***
7	Perform voice test	Press automatic button (A) repeatedly until **VOICE T** appears	**VOICE T ***
		Confirm **VOICE T**	**Voice output**

		with multifunction button below (*)	
		[i] The unit switches automatically to service mode	**Voice T ***
8	GAL test	Press automatic button (A) repeatedly until **GAL TEST** appears	**GAL TEST ***
		Confirm **GAL TEST** with multifunction button below (*)	**0 R1**
		[i] The display means: Vehicle standing still. The number following R means: Direction of motion 1 = forward, 2 = backward	
		Drive vehicle forwards while keeping track of numbers	**e. g. 1220 R1**
		Drive vehicle backwards while keeping track of numbers	**e. g. 890 R2**
		Press multifunction button (<--)	**GAL TEST ***
9	Initialize GPS	Press automatic button (A) repeatedly until **GPS INIT** appears	**GPS INIT ***
		Conform **GPS INIT** with multifunction button below (*)	**Enter LOCATION.....**
		Enter the closest digitalized town with population of more than 50,000 with the multifunction keys	**Esslingen**
		[i] A number in front of the location indicates that there are several locations with the same name	**1 Esslingen/Bittburg** **2 Esslingen am Neckar**
		Press repeatedly to reach the right location	**2 Esslingen am Neckar**

		with the automatic button (A) (allow running letters to run until they finish)	
		Press multifunction button below (*)	**Enter street name.....**
		Enter closest digitalized street name or **CENTER** or **TRAIN STATION** with the multifunction buttons	**Train station**
		[i] A number in front of the street indicates that there are several streets with the same name	
		Press automatic button (A) repeatedly until the right street name appears (allow running letters to run until they finish)	
		Press multifunction button below (*) until message appears. . . .	**Please switch off radio and ignition for 1 minute**
		[i] First switch off unit and then ignition	
10	Start engine	[i] Drive vehicle outside under free sky	
11	Activate service module	Press mode button (M) repeatedly until **NAVIGATE** appears	**NAVIGATE**
		Press automatic button (A) repeatedly until **CONFIG** appears	**CONFIG 1 2 3 4 5 6 7 8***
		Confirm **CONFIG** with multifunction key below (*)	**SYSTEM 1 2 3 4 5 6 7 8 ***
		Confirm **SYSTEM** with multifunction button (GHI) and (MNO)	**MODULE T ***
		Press automatic button (A) repeatedly until **GPS TEST** appears	**GPS TEST ***
12	Perform GPS antenna	Confirm **GPS TEST**	**FIX OK**

	test	with multifunction button below (*)	
		[i] If the test is erroneous the following messages can appear: **No GPS:** GPS antenna incorrectly connected **NO FIX:** GPS antenna cannot receive satellites	
		Press multifunction button (<--)	**GPS TEST ***
		Press mode button (M) repeatedly until **NAVIGATE** appears	**NAVIGATE**
13	Calibration drive	[i] The duration of the calibration drive is dependent on the vehicle model and the number of times the direction is changed. It can be between 30 km and 100 km and can be interrupted as long as desired at any time.	**Calibration status not achieved [0]**
14	Calibration status achieved	[i] When the calibration status [2] is reached the unit automatically requests entry of the location.	**Please enter location.....**

RETROFITTING TRAFFICSTAR NAVIGATION SYSTEM - AZ82.61-P-0001I

MODEL 163 up to 30.6.99 except CODE (819) 6-disk CD changer in trunk

System illustration

1 TrafficStar navigation system
2 GPS antenna
3 Antenna lead
4 TrafficStar wiring harness
5 CAN bus adapter
6 CAN bus lead
8 CAN bus adapter connector

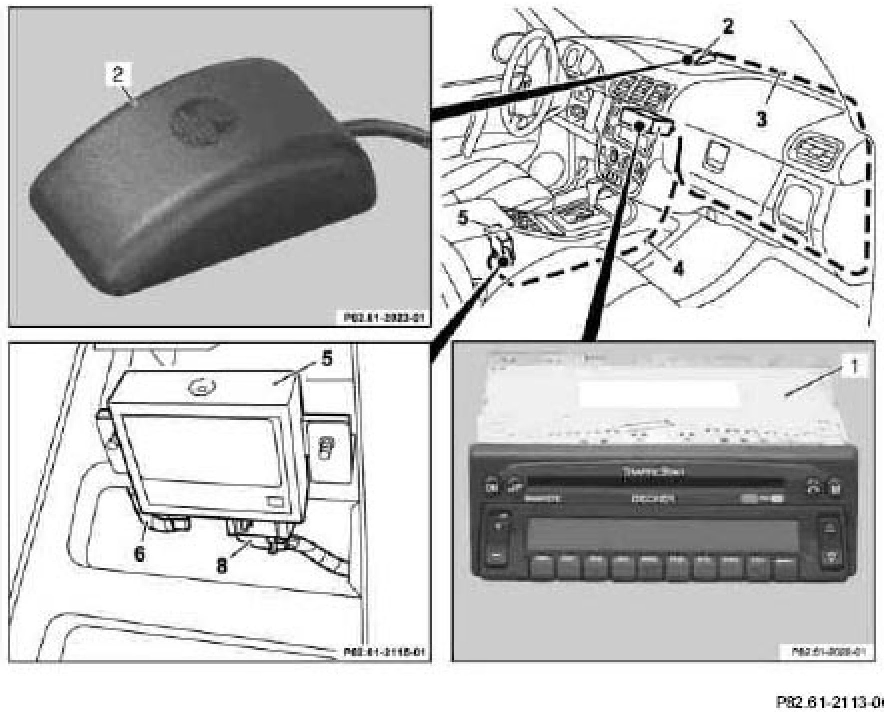


Fig. 336: Identifying Trafficstar Navigation System Components

i	Notes on TrafficStar navigation system	Models 129, 140, 163, 168, 170, 202, 208, 210	**AH82.61-P-0001-03A**
	Removal		
1 AR	Disconnect ground lead from battery		**AR54.10-P-0003A**
2	Remove radio	AR	**AR82.60-P-7502EA**
3 AR	Remove center console		**AR68.20-P-2000GH**
4 AR	Remove cover below right instrument panel		**AR68.10-P-1520GH**
5	Remove paneling from A-pillar	i Only in area of instrument panel	
AR			**AR68.30-P-4050GH**
	Installation		
6	Retrofit TrafficStar GPS antenna on instrument panel		AZ82.61-P-0001-01F
7	Connect TrafficStar radio	i Only on vehicles with	**AZ82.61-P-0001-02G**

	and navigation system	sound system i Only on vehicles without sound system	**AZ82.61-P-0001-02I**
8	Reassemble vehicle, 5-1		
9	Carrying out start-up and function check		**AZ82.61-P-0001-04A**

Parts ordering notes

Part no.	**Designation**	**Quantity**
B6 782 2500	TrafficStar navigation system parts kit	1
B6 782 2514	TrafficStar navigation system with precious wood finish, burr walnut veneer	1
B6 782 2519	CAN bus adapter parts kit	1
B6 782 2595	TrafficStar wiring harness with sound system	1
B6 782 2594	TrafficStar wiring harness without sound system	1
B6 782 2596	CAN bus wiring harness	1

RETROFITTING TRAFFIC PRO WIRING HARNESS - AZ82.61-P-0002-01H

Model 163 with transmission 722 up to 30.6.2000

1. Prepare adapter wiring harness (4) as shown in figure.
2. Cut off orange (or) lead for reverse lamp signal (2) at connector (C) and provide with contact spring.

   i Connector (C) no longer required after cutting off.

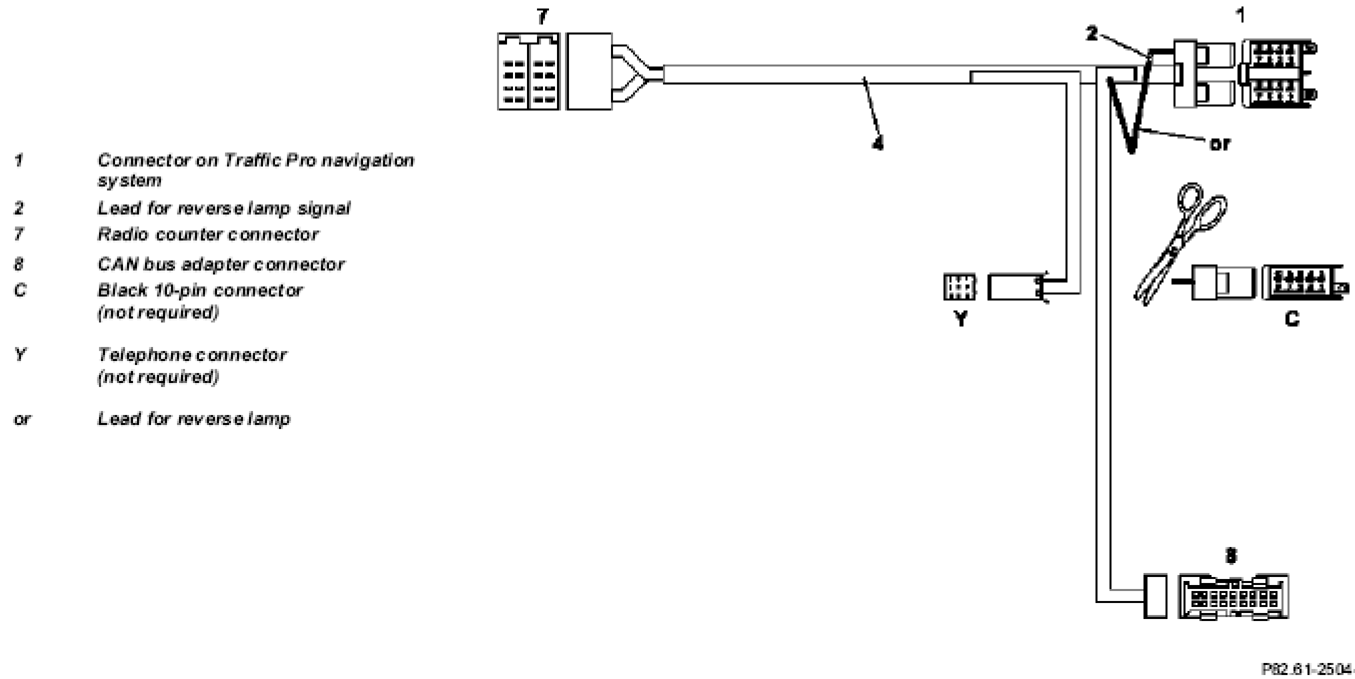


Fig. 337: Identifying Traffic Pro Wiring Harness

3. Insert contact spring of orange lead for reverse lamp signal (2) into radio connector (A) chamber 2 of adapter wiring harness (4).

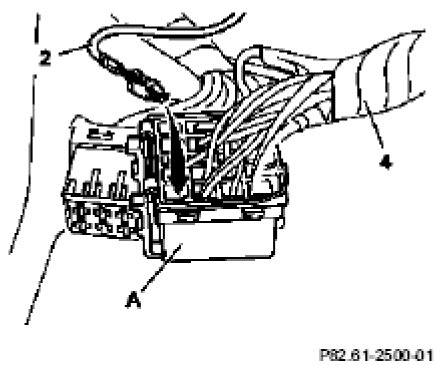


Fig. 338: Identifying Radio Connector And Adapter Wiring Harness

4. Route adapter wiring harness (4) in vehicle along existing wires as shown in figure.

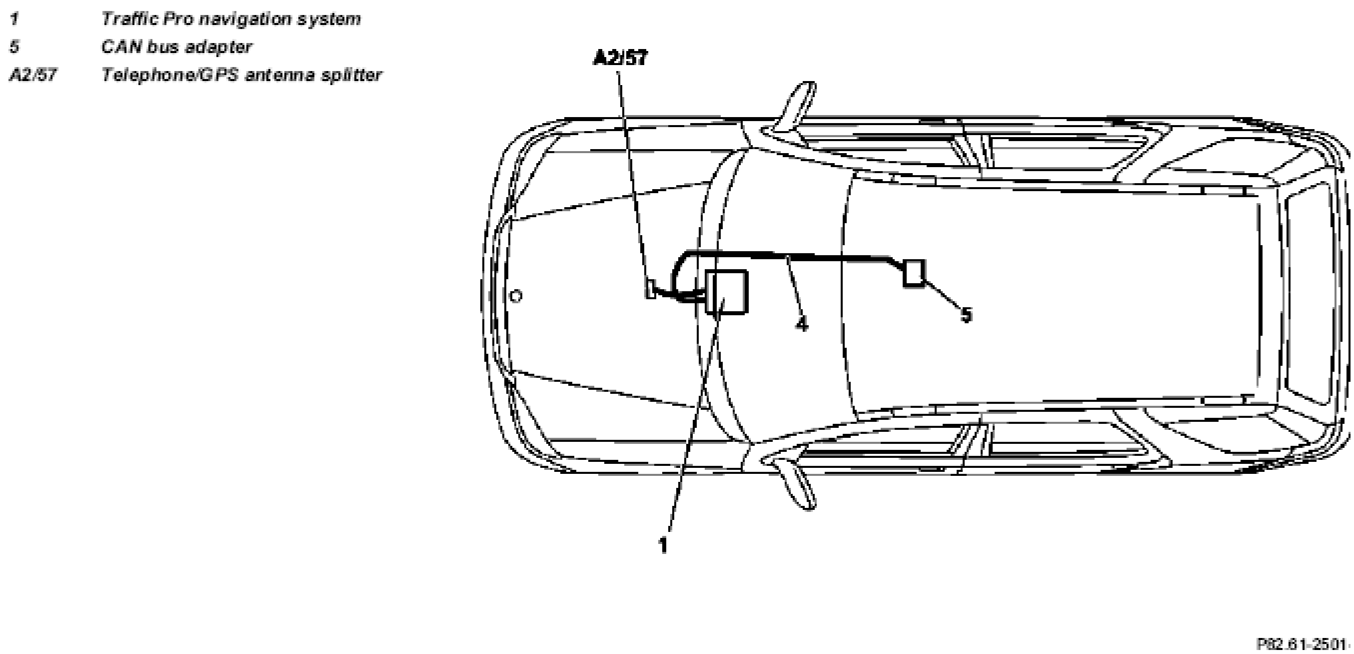


Fig. 339: Identifying Telephone/GPS Antenna Splitter And CAN Bus Adapter

5. Connect adapter wiring harness (4) to radio counter connector (7) on standard wiring harness and Traffic Pro navigation system (1).

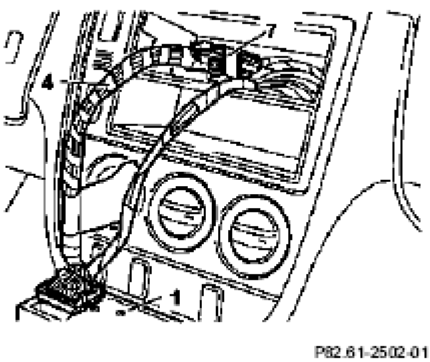


Fig. 340: Identifying Adapter Wiring Harness And Radio Counter Connector

6. Connect antenna extension lead (41) to Traffic Pro navigation system as shown in figure.

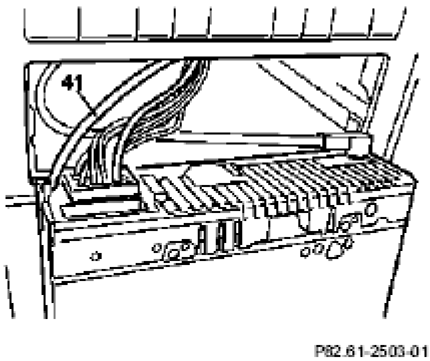


Fig. 341: Identifying Antenna Extension Lead

7. Route tieout to CAN bus adapter (5) from adapter wiring harness (4) as shown in figure toward rear on middle tunnel.

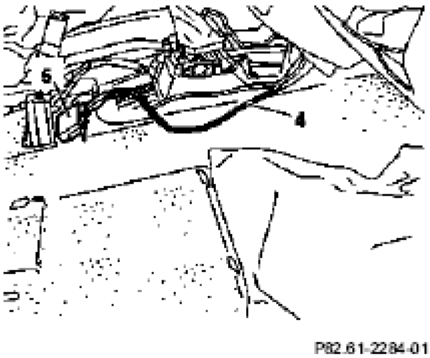


Fig. 342: Identifying CAN Bus Adapter And Adapter Wiring Harness

8. Position CAN bus adapter mount on center console brace as shown in figure and mark holes (arrows).
9. Drill 6.2 mm dia. mounting holes

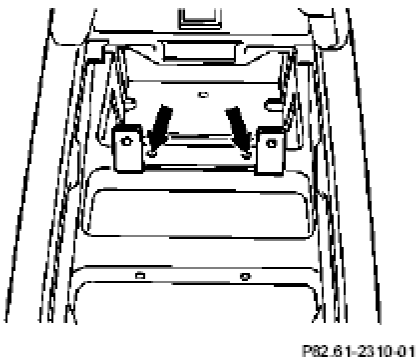


Fig. 343: Identifying Mark Holes

10. Fasten CAN bus adapter (5) with self-tapping screws from CAN bus adapter parts kit.

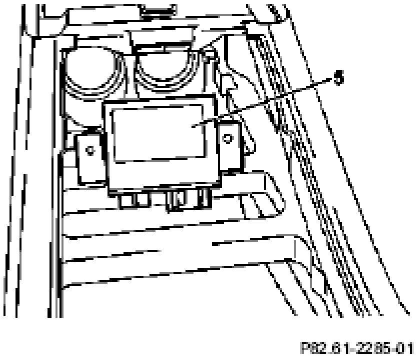


Fig. 344: Identifying CAN Bus Adapter

11. Install white (ws) and blue (bl) fuse on connector for transfer case control module (N78) from CAN bus wiring harness (9) as shown in figure.

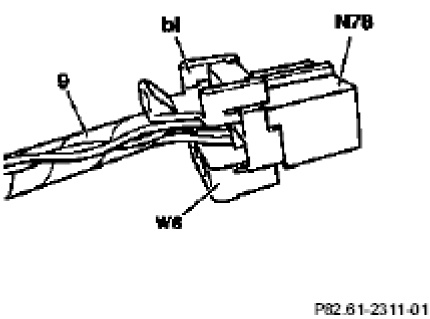


Fig. 345: Identifying Transfer Case Control Module And CAN Bus Wiring Harness

12. Disconnect connector from transfer case control module (N78) and connect CAN bus wiring harness (9) between transfer case control module (N78) and standard wiring harness.

    [i] Illustrated without center console

13. Connect CAN connector (6) from CAN bus wiring harness (9) to CAN bus adapter (5).

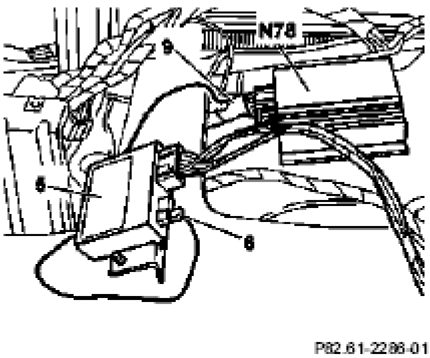


Fig. 346: Identifying CAN Bus Adapter And CAN Connector

RETROFITTING TRAFFIC PRO NAVIGATION SYSTEM - AZ82.61-P-0002H

MODEL 163 up to 30.6.00

except CODE (810) Sound system

except CODE (819) 6-disk CD changer

except CODE (316) MB GSM cellular telephone (D2B)

except CODE (317) GSM portable cellular telephone (D2B)

System illustration with telephone and GPS roof antenna

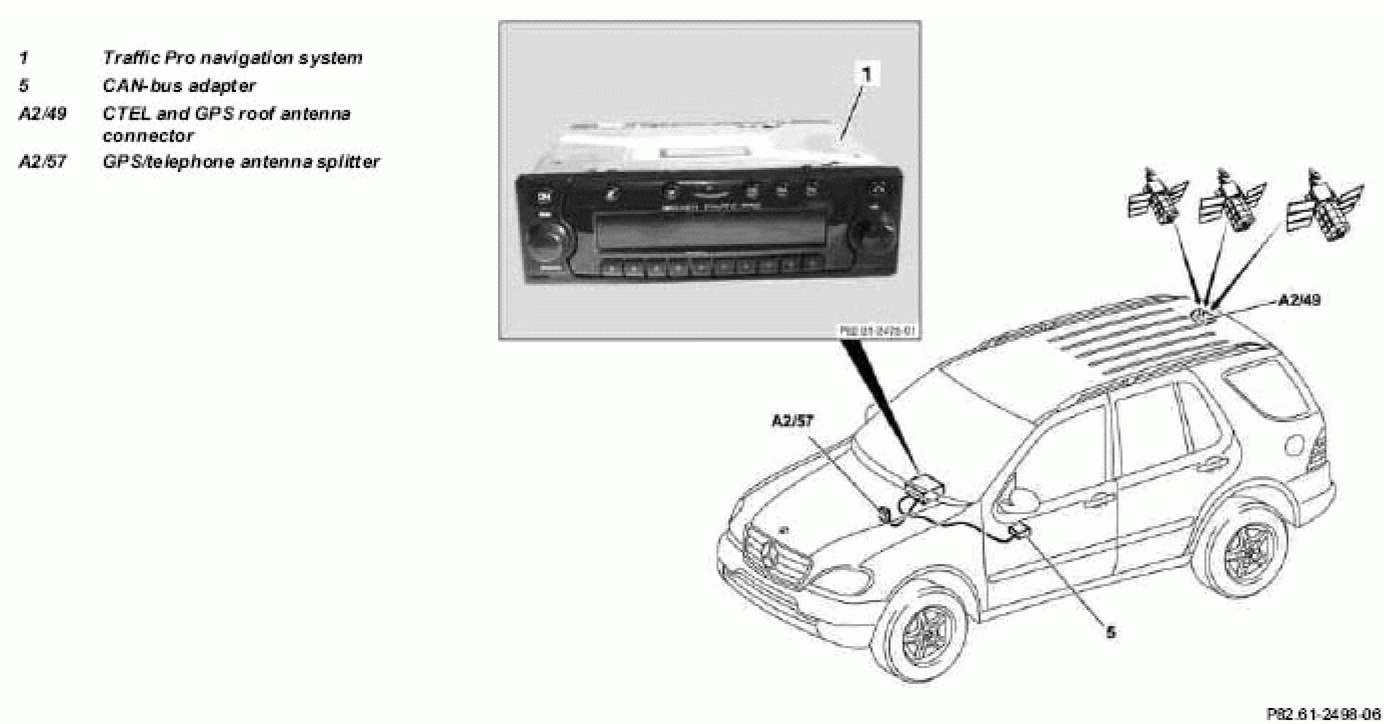


Fig. 347: Identifying Traffic Pro Navigation System Components

i	See notes on radio connector pin assignment	Models 163.	**AH82.61-P-0001-05A**
i	Notes on Traffic Pro navigation system	Models 129, 140, 163, 168, 170, 202, 208, 210.	**AH82.61-P-0002-01A**
	Removal		
1 AR	Disconnect ground cable of battery		**AR54.10-P-0003A**
2	Remove radio		

AR			**AR82.60-P-7502EA**
3	Remove center console	AR	**AR68.20-P-2000GH**
	Install		
4	Retrofit global positioning system (GPS) antenna on roof	i for vehicles with engine 111 or to 9.99	**AN82.61-P-7474-04AZ**
5	Retrofit Traffic Pro wiring harness	Vehicles with automatic transmission. Vehicles with manual transmission.	**AZ82.61-P-0002-01H** AZ82.61-P-0002-01HH
6	Fit remaining parts to vehicle 3-1		
7	Enable radio code	i See operating instructions.	
8	Start up Auto-Pilot-System	i See operating instructions from Becker company	

Parts ordering notes

Part no.	Designation	Quantity
B6 782 30 24	Traffic Pro navigation system parts kit	1
Group 82 (see EPC)	CTEL and GPS antenna	1
Group 82 (see EPC)	Antenna lead from splitter to radio	1
Group 82 (see EPC)	Adapter wiring harness (without sound system) (vehicles with engine 111 or up to 9.99)	1
Group 82 (see EPC)	CAN bus wiring harness (vehicles with engine 111 or up to 9.99)	1
Group 82 (see EPC)	CAN bus adapter (vehicles with engine 111 or up to 9.99)	1
A011 545 80 26	Contact spring (radio)	2
Commercially available	Green lead 0.5 mm^2	2m
Group 82 (see EPC)	Antenna splitter	1

RETROFITTING CD CHANGER - AZ82.64-P-0001MA

MODEL 163 as of 1.7.99

in combination with Audio 10, Audio 30 radio or COMAND operating and display system and D2B fiber optical cable

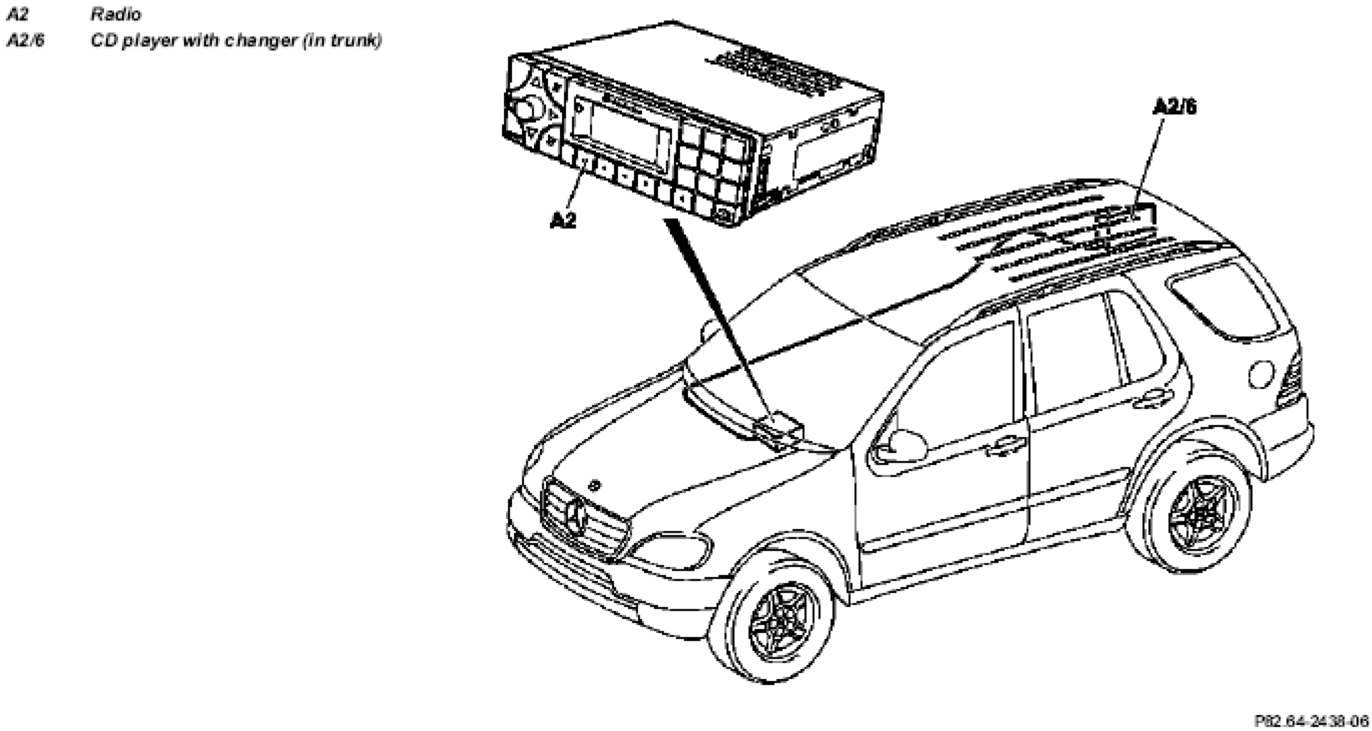


Fig. 348: Identifying CD Changer Components

	Remove		
1 AR	Disconnect ground cable of battery Disconnect ground lead from battery		**AR54.10-P-0003A**
2 AR	Remove radio Remove/install radio		**AR82.60-P-7502EA**
3 AR	Remove right side paneling in footwell Remove/install paneling in footwell		**AR68.30-P-4010GH**
4 AR	Remove right-hand side entrance strip Remove/install door sill molding		**AR68.30-P-4100GH**
5	Unscrew the bolt for the outer rear seat belt on the right side	Nm	***BA91.40-P-1001-01D**
6	Remove the front load compartment hooks on the right C-pillar		
7	Remove load		

	compartment cover and unscrew the bolt in the bracket		
8	Remove cover for the CD changer and unscrew bolt behind the cover in the top left corner		
	Install		
9	Retrofitting D2B wiring harness for CD changer	Risk of fracture! Do not kink or stretch the D2B fiber optic cable. Install caps on fiber optic cable connector and equipment connection.	AZ82.64-P-0001-01MA
AR	Cover fiber optic cable		**AR82.95-P-0005-01A**
10	Retrofit CD changer in trunk		AZ82.64-P-0001-05MA
11	Complete vehicle (following steps 8 to 1)		
12	Carry out start-up and function test	Code CD changer to vehicle with STAR DIAGNOSIS.	

Nm Seat belts/emergency tensioning retractors

Number	Designation		Model 210 up to 08/99	Model 163 as of 09/99
BA91.40-P-1001-01D	Belt end fitting screw	NM	35	35

Parts ordering notes

Part no.	Designation	Quantity
KG82 Group 82 (see EPC)	CD changer	1
KG82 Group 82 (see EPC)	Wiring harness, fiber optic cable	1
KG82 Group 82 (see EPC)	Holder for CD changer	1
KG54 (see EPC)	Contact spring	1
KG82 Group 82 (see EPC)	Coupling, 10-pin	1
KG82 Group 82 (see EPC)	Plug (radio)	1
KG82 Group 82 (see EPC)	Plug (CD changer)	1
KG82 Group 82 (see EPC)	Protective cap	2
KG82 Group 82 (see EPC)	Clip fastener for screw plug	1
KG82 Group 82 (see EPC)	Clip fastener for bracket	2

RETROFITTING TELEPHONE CONSOLE - AZ82.70-P-0001-01A

Model 163 up to 31.8.00 for Nokia 3110 portable CTEL

1. Place assembly plate (10) onto telephone console (12) as shown in figure and align to size: a=20 mm and b=55 mm. Mark hole pattern and drill with 2.5 dia. bit.
2. Attach assembly plate (10) to telephone console (12) with screws (11).

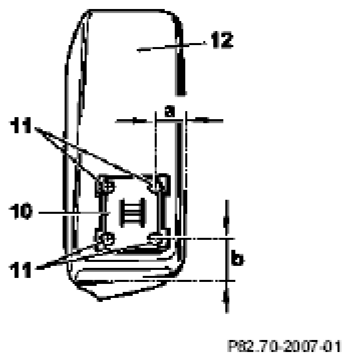


Fig. 349: Identifying Telephone Console And Assembly Plate

3. Plug connection cable into mount and route to the rear in a curve (arrow) as shown in figure.

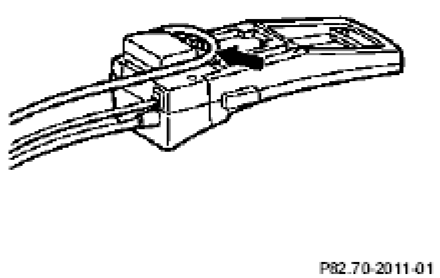


Fig. 350: Plugging Connection Cable Into Mount

4. Fasten mount (1) to assembly plate (10) with locating screw (16).

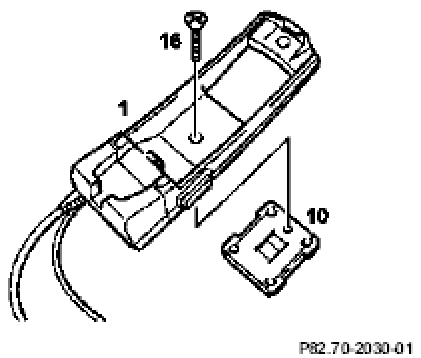


Fig. 351: Identifying Fasten Mount And Assembly Plate

5. Install holder (1) on telephone console (12) and stick the antenna lead (17) as well as the connection cable

(2) into the console with felt (arrows).

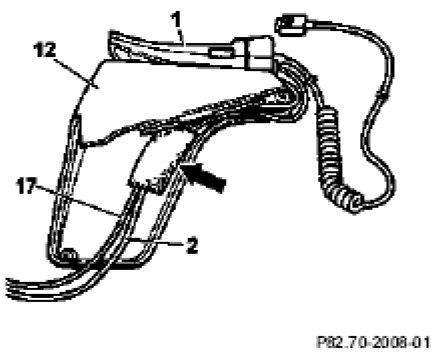


Fig. 352: Identifying Holder And Telephone Console

6. Push telephone console below wood trim cover (arrows) and press against right tunnel wall.
7. Mark hole for screw (13) and drill with Ø 5 mm.

   When drilling pull tunnel wall outward slightly so that parts behind cannot be damaged.

8. Install clip nut (14) on tunnel wall and install screw (13).
9. Connect antenna cable (17) to vehicle antenna cable.
10. Push connection cable (2) and antenna cable (17) below tunnel wall, route along existing wiring to radio slot and stick the connector of the antenna cable tight with felt.

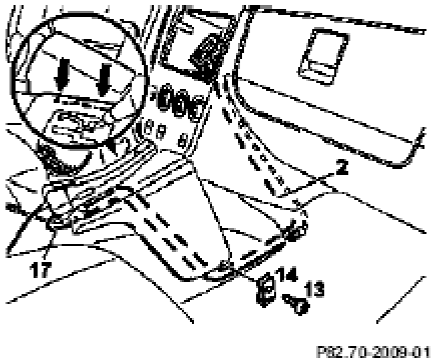


Fig. 353: Pushing Connection Cable

RETROFITTING TELEPHONE CONSOLE - AZ82.70-P-0001-01C

Model 163 as of 1.12.99 up to 31.8.00 for Nokia 6090 fixed installation CTEL

1. Remove cover (1 a) from telephone handset mount (1).
2. Insert assembly plate (10) below into mount (1).

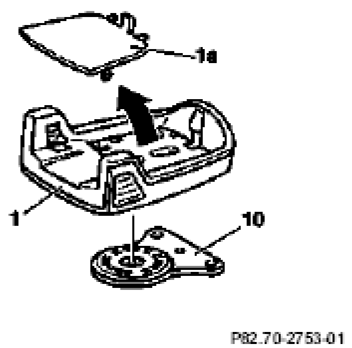


Fig. 354: Identifying Cover For Telephone Handset Mount

3. Place mount (1) onto telephone console (12) as shown in figure and align. Mark hole pattern and drill with 2.5 dia. bit.
4. Attach mount (1) to telephone console (12) with screws (11).
5. Insert cover (1a) again.

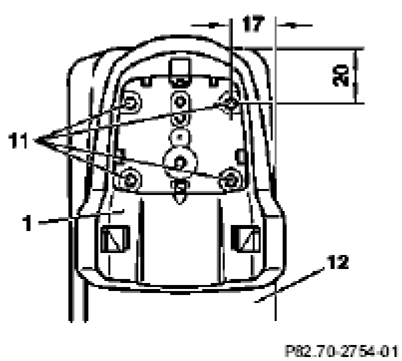


Fig. 355: Identifying Mount, Telephone Console And Screws

6. Install telephone handset (8), insert spiral cable as shown in figure with the fifth spiral into the opening of the telephone console and fix in place with adhesive felt (arrow).

1 Telephone set mount
12 Telephone console

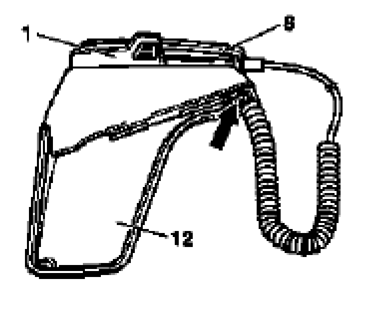


Fig. 356: Identifying Telephone Console And Telephone Set Mount

7. Insert plug connection of telephone wiring harness (2) into bottom part of housing as shown in figure and

fit on top part of housing.

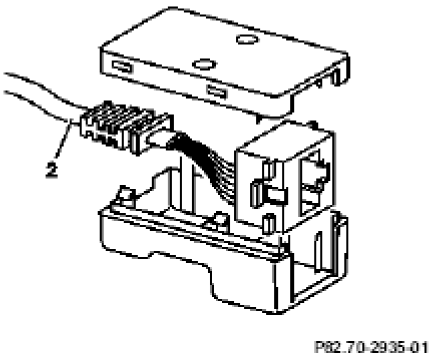


Fig. 357: Identifying Telephone Wiring Harness

8. Fit connection cable of telephone wiring harness (2) to spiral cable (comes from radio slot). Pull foam rubber grommet over connector.
9. Push telephone console (12) below the wood trim cover (arrows) and press against right tunnel wall.
10. Mark hole for screw (13) and drill with Ø 5 mm.

When drilling, pull tunnel wall out slightly so that parts behind cannot be damaged.

11. Install clip nut (14) on tunnel wall and install screw (13).
12. Push connection cable (2) below tunnel wall.

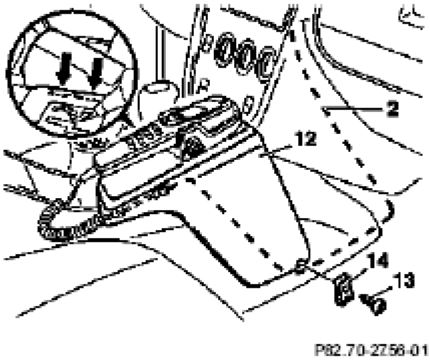


Fig. 358: Pushing Telephone Console

RETROFIT TELEPHONE CONSOLE - AZ82.70-P-0001-01G

MODEL 163 as of 1.10.01

1. Lay assembly plate (10) on telephone console (12) and align as shown in figure. Mark hole pattern and drill with 2.5 dia. bit.
2. Screw assembly plate (10) onto telephone console (12) with screws (11).

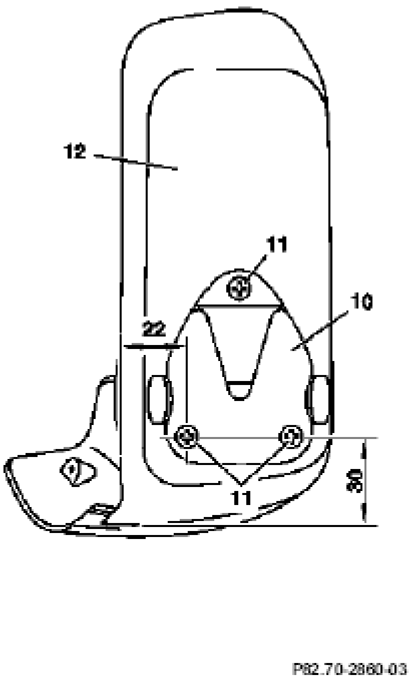


Fig. 359: Identifying Telephone Console And Assembly Plate

3. Insert mount (1) into assembly plate (10) and install spiral cable into groove (arrow) of telephone console (12) together with grommet.

17	Antenna wire
H4/12	Hands-free speaker

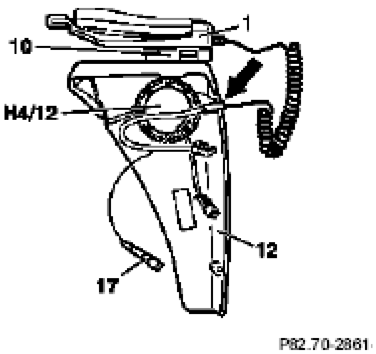


Fig. 360: Identifying Mount, Assembly Plate And Telephone Console

4. Screw mount for console (14) to instrument panel with upper right mounting screw (arrow) of air conditioning control module.

   [i] Holder for console (14) must be installed behind A/C control panel.

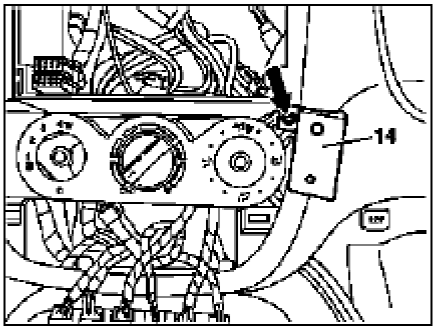


Fig. 361: Identifying Console And Screw

5. Route tieouts (A and B) for cellular telephone wiring harness (2) and antenna lead (17) to console (12) and connect.
6. Form excess lengths of the connection cables into a loop and secure with Velcro (18).
7. Route cables for connection plug (5) behind the center console to the right seat.

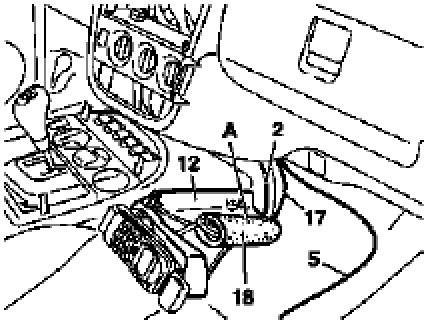
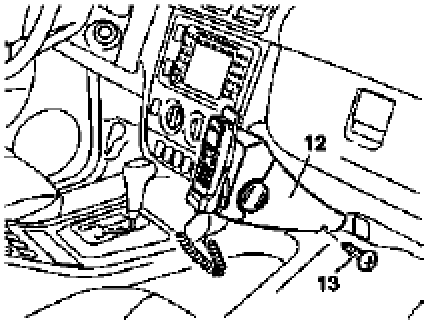


Fig. 362: Identifying Cellular Telephone Wiring Harness And Antenna Lead

8. Insert console (12) into mount holes on air conditioning control module using locating pin and align at instrument panel.
9. Mark hole for screw (13) and drill with 2.5 mm dia. bit.

When drilling in instrument panel do not damage parts behind.

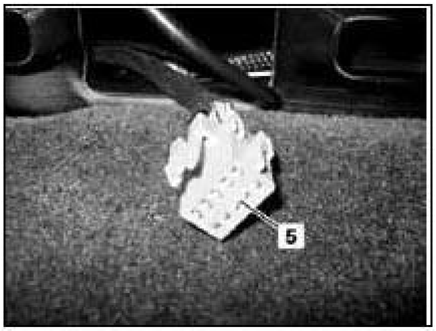
10. Screw console (12) to instrument panel with screw (13).



P82.70-2864-01

Fig. 363: Identifying Console And Screw

11. Expose tied-back cables with coupling (5) behind the front passenger seat.



P82.70-4074-01

Fig. 364: Identifying Coupling

12. Connect antenna lines (arrow) and insulated with Velcro.



P82.70-4073-01

Fig. 365: Identifying Antenna Lines

13. Connect blue coupling to connection plug (5).
14. Tie back cables under the seat and secure with Velcro.



P82.70-4075-01

Fig. 366: Identifying Connection Plug

RETROFIT WIRING HARNESS - AZ82.70-P-0001-04C

Model 163 as of 1.12.99 up to 31.8.00 for Nokia 6090 fixed installation CTEL

1. Prepare telephone wiring harness (2) as shown in figure.
2. Tie back audio line-out cable with 4-pin connector (25) (is not required).
3. Expose two red (rt) and two black (sw) cables.

bl *Blue lead (circuit 15)*
ge *Yellow lead (mute)*
gr *Gray lead (circuit 58d)*
or *Orange lead for automatic antenna (tie back, not required)*
rt *Two red leads circuit 30)*
sw *Two black leads (circuit 31)*

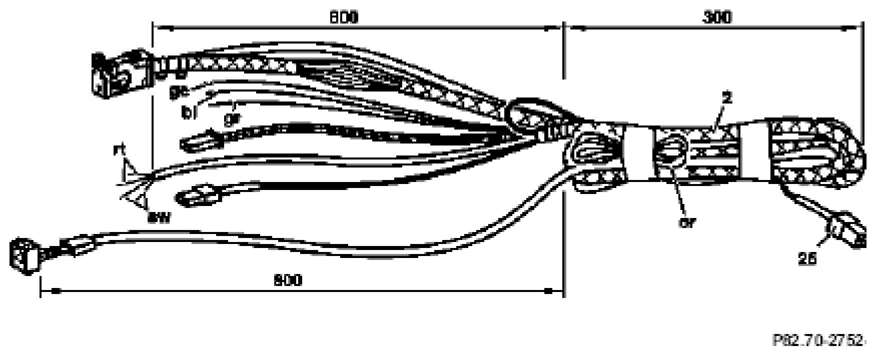


Fig. 367: Identifying Telephone Wiring Harness

4. Unlock catch (arrows) of connector (21) one detent.
5. Fit cable terminals (22) to the red (rt) leads and insert into chambers 3 and 9 of the connector (21).
6. Fit cable terminals (22) to the black (sw) leads and insert into chambers 4 and 6.
7. Insulate orange cable and tie back (is not required).
8. Fit cable terminal (22) to blue (bl) lead and insert into chamber 5.
9. Fit cable terminal (22) to yellow (ge) lead and insert into chamber 2.
10. Fit cable terminal (22) to gray (gr) lead and insert into chamber 7.
11. Lock connector (21).

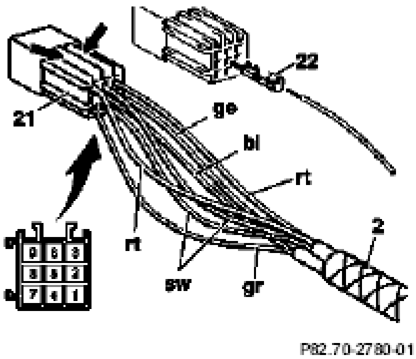


Fig. 368: Identifying Lock Connector And Cable Terminals

12. Insert wiring harness (2) into instrument panel working from the glove compartment.

    ℹ The tied-back part must be placed below the strut (arrows) at the glove compartment.

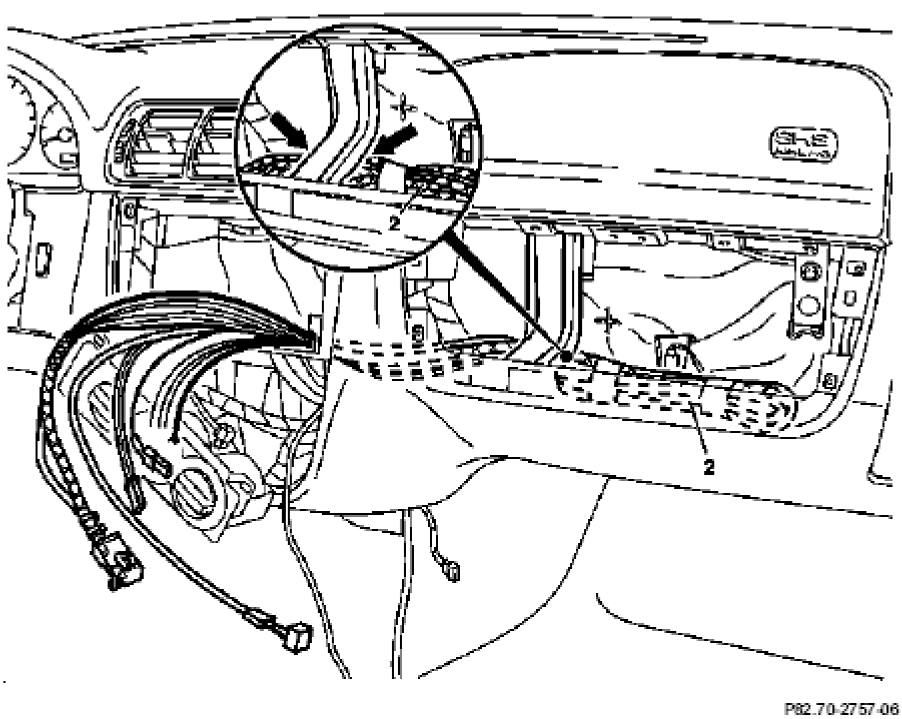


Fig. 369: Identifying Telephone Wiring Harness

13. Connect telephone wiring harness (2) to adapter wiring harness (9).
14. Check fuse (23) (a 10A fuse should be present).

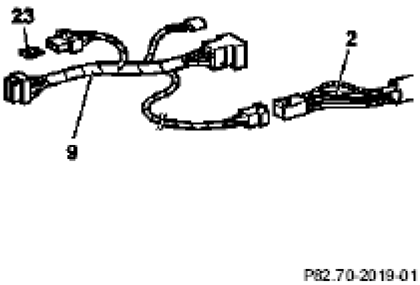


Fig. 370: Identifying Fuse And Telephone Wiring Harness

15. Connect adapter wiring harness (9) to radio wiring harness and insert into radio slot.
16. Place microphone cable of telephone wiring harness (2) into radio slot.

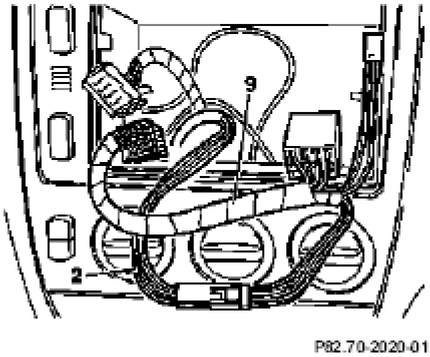


Fig. 371: Identifying Adapter Wiring Harness And Telephone Wiring Harness

17. Route connection cable of telephone wiring harness (2) to telephone handset in middle tunnel as shown in figure.

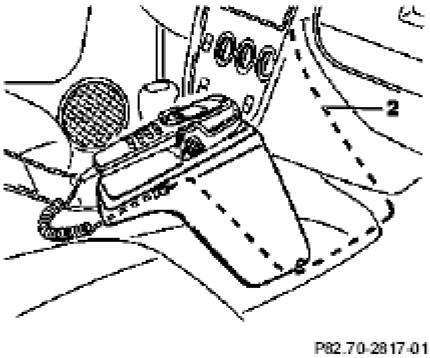


Fig. 372: Identifying Telephone Wiring Harness

RETROFIT WIRING HARNESS - AZ82.70-P-0001-04D

Model 163 as of 1.12.99 up to 31.8.00 for Nokia 3110 portable CTEL

1. Shop-make wiring harness as specified in steps 2 to 6.
2. Cut cables at connection adapter (20) to length of approx. 150 mm.
3. Install terminal (22) on five free lead ends of connection adapter (20) (not to green lead).
4. Release catch (arrows) at connector (21) one detent.
5. Insert terminal of red (rt) lead into chamber 3

   Terminal of yellow (ge) lead into chamber 2

   Terminal of black (sw) lead into chamber 4

   Terminal of blue (bl) lead into chamber 5

   Insulate terminal of green (gn) lead and tie back (not required).

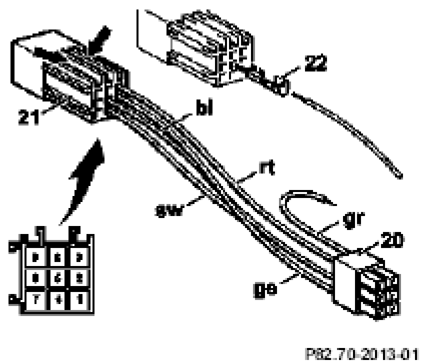


Fig. 373: Identifying Lock Connector And Terminals

6. Lock connector (21).
7. Connect prefabricated wiring harness (8) to adapter wiring harness (9).
8. Check fuse (23) (a 10A fuse should be present).

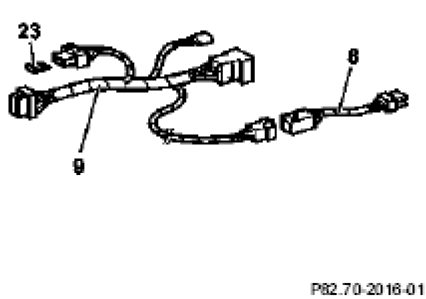


Fig. 374: Identifying Adapter Wiring Harness And Fuse

9. Connect adapter wiring harness (9) to radio wiring harness.
10. Connect microphone cable and loudspeaker cable to hands-free unit (3).
11. Plug in connection cable (2) and fit on cover (6).

12. Connect prefabricated wiring harness (8) to connector (24) for hands-free system.

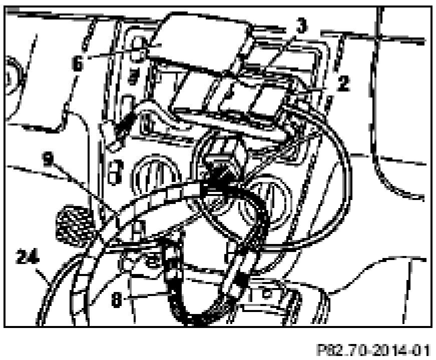


Fig. 375: Identifying Adapter Wiring Harness And Hands-Free Unit

13. Attach hands-free unit (3) with assembly base (4) to mount of hands-free unit (20).

    [i] Speaker mount (21) is attached to the assembly base.

14. Route pre-assembled hands-free system into the area at the back to the AC operating unit.



Fig. 376: Identifying Hands-Free Unit And Assembly Base

RETROFIT WIRING HARNESS. - AZ82.70-P-0001-04G

MODEL 163 as of 1.10.01

1. Prepare portable cellular telephone wiring harness (2) as shown in figure

3	FSE interface
5	Connection for microphone plug on seat
A	Loudspeaker connector
B	Portable cellular telephone mount connector
D	Adapter wiring harness connector

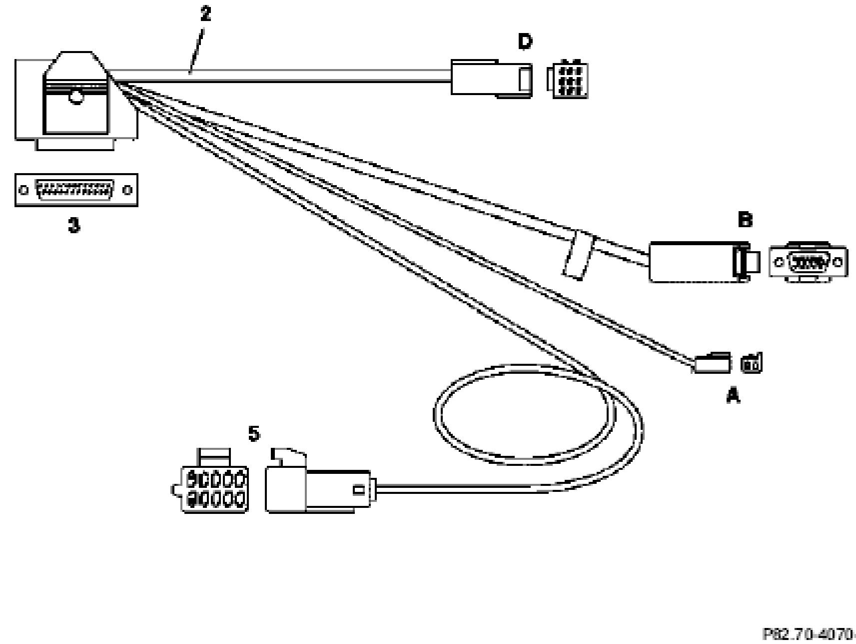


Fig. 377: Identifying Portable Cellular Telephone Wiring Harness

2. Bolt FSE interface (3) to interface bracket (15) with 2 torx bolts (16).
3. Connect portable CTEL wiring harness (2) to FSE interface (3).

5	Connection for microphone plug on seat
A	Loudspeaker connector
B	Portable cellular telephone mount connector
D	Adapter wiring harness connector

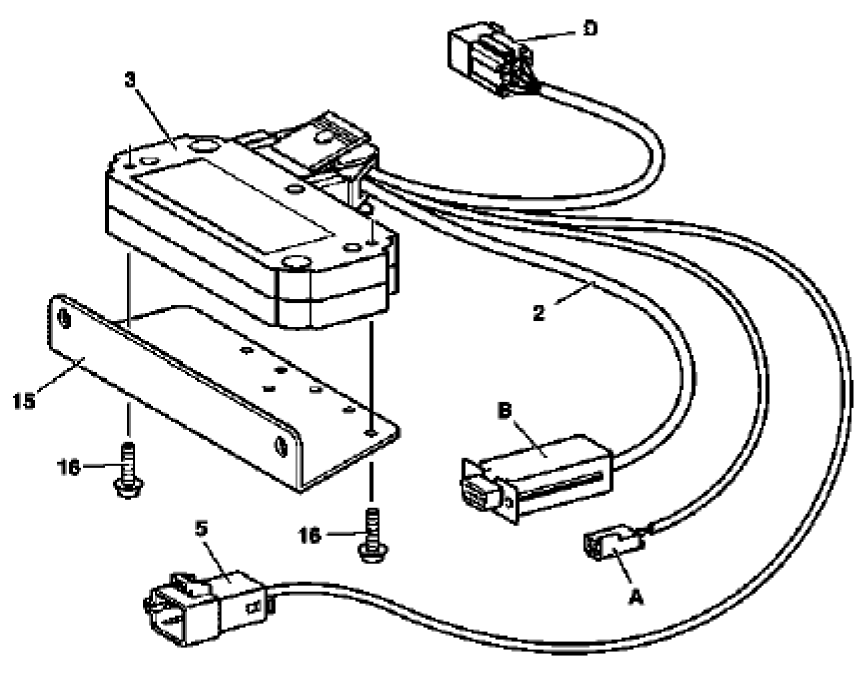


Fig. 378: Identifying Portable CTEL Wiring Harness And Components

4. Unscrew sheet metal screws (30) from instrument panel.
5. Install mount (15) together with interface between mounting lugs (31) and (32) as shown in figure and fasten with sheet metal screws (30).
6. Route connection plug for adapter wiring harness (D) upward into the radio recess.

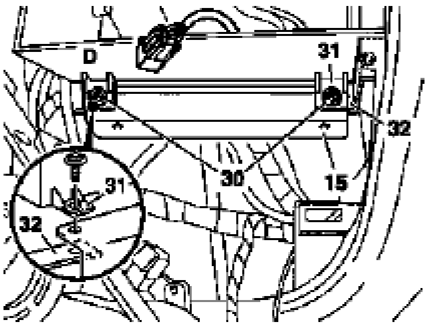


Fig. 379: Identifying Mounting Lugs And Sheet Metal Screws

7. Connect portable cellular telephone wiring harness (2) to adapter wiring harness (9).
8. Check fuse (23) (a 10A fuse should be present).

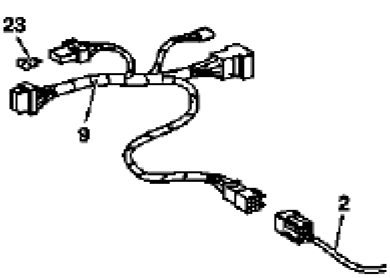


Fig. 380: Identifying Fuse And Telephone Wiring Harness

9. Connect adapter wiring harness (9) to radio connector.

2 Portable cellular telephone wiring harness
D Connector for adapter wiring harness

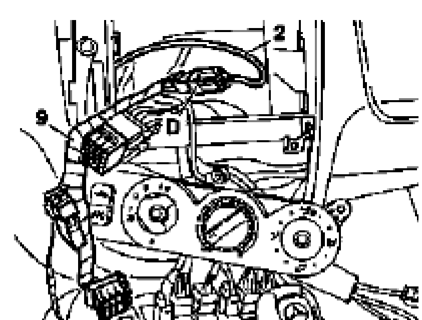


Fig. 381: Identifying Portable Cellular Telephone Wiring Harness And Connector For Adapter Wiring Harness

RETROFIT WIRING HARNESS - AZ82.70-P-0001-04GH

1. Prepare portable CTEL wiring harness (2) as shown in figure.

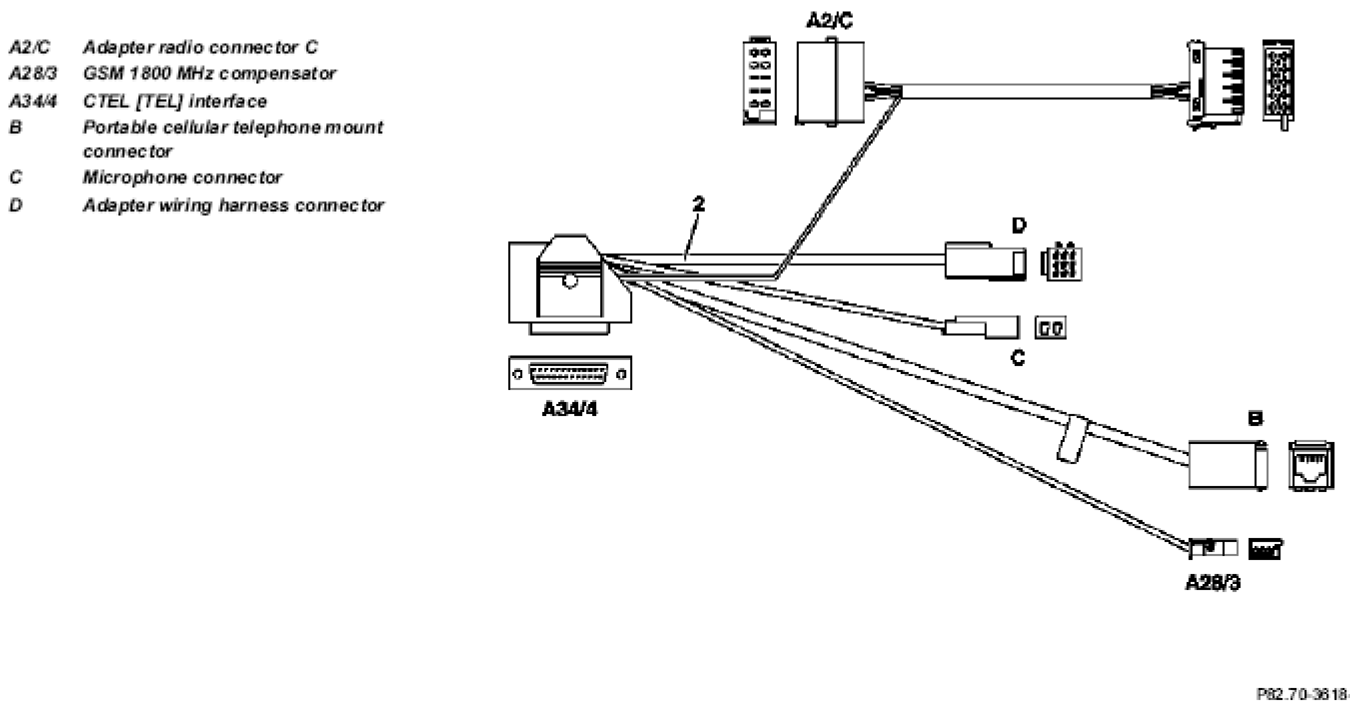


Fig. 382: Identifying Portable CTEL Wiring Harness

2. Attach CTEL interface (A34/4) to interface mount (15) with 2 torx screws (16).
3. Attach GSM 1800 MHz compensator (A28/3) to mount (15) with 2 torx screws (16).
4. Connect portable cellular telephone wiring harness (2) to CTEL interface (A34/4).
5. Connect branch of portable CTEL wiring harness (2) to GSM 1800 MHz compenstor (A28/3).
6. Connect antenna cables to GSM 1800 MHz compensator (A28/3).

17 Antenna cable to portable CTEL
19 Antenna connection cable
B Portable cellular telephone mount connector
C Microphone connector
D Adapter wiring harness connector

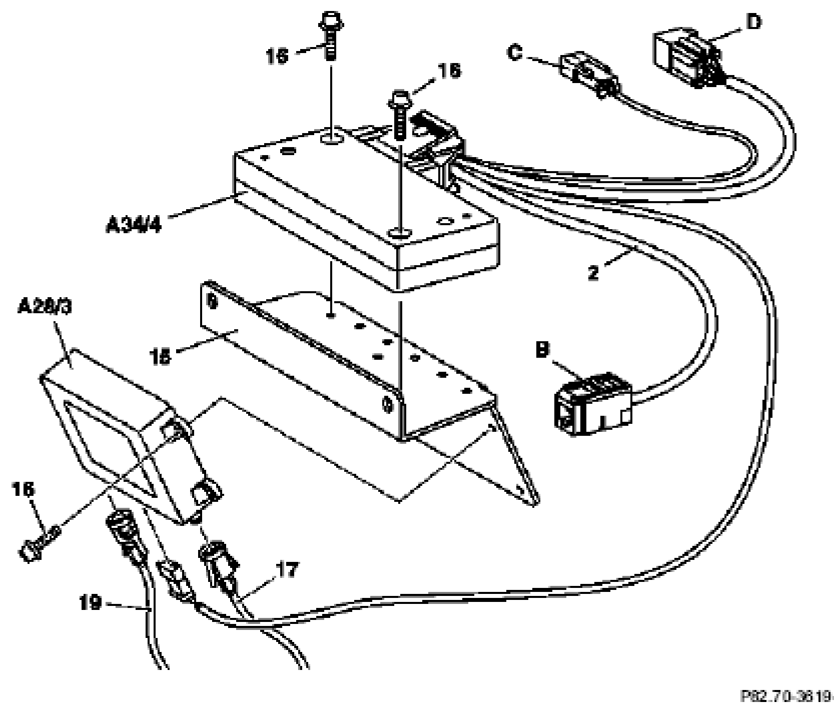


Fig. 383: Identifying Portable Cellular Telephone Wiring Harness And Components

7. Unscrew self-tapping screws (50) at instrument panel.

   [i] Insert mount with control modules from above through the radio opening.

8. Connect fiber optic cable.
9. Insert mount (15) with interface as shown in figure between the two mounting plates (51) and (52) and attach with the self-tapping screws (50).
10. Route microphone connector (C) and adapter wiring harness connector (D) upward into radio shaft.

A28/3 E-net compensator

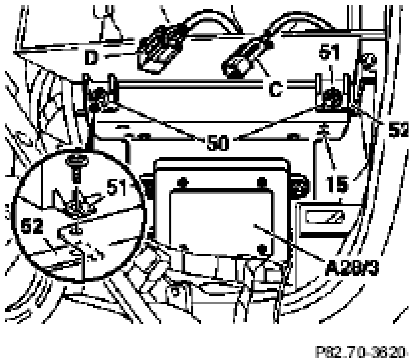


Fig. 384: Identifying Self-Tapping Screws And Microphone Connector

11. Connect portable CTEL wiring harness (2) to adapter wiring harness (9).
12. Inspect fuse (23) (a 10A fuse must be fitted).

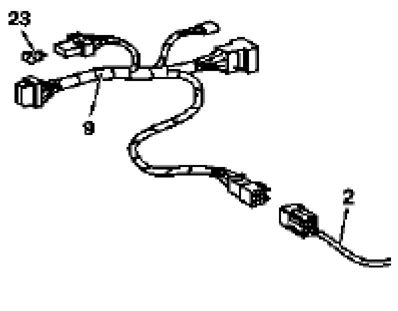


Fig. 385: Identifying Fuse And Portable CTEL Wiring Harness

13. Expose tied back green 2-pin connector (E) for standard microphone lead and connect with microphone connector (C) from portable cellular telephone wiring harness (2).
14. Connect adapter wiring harness (9) to radio connector.
15. Fit together radio connector C and adapter (A2/C).

i On models fitted with COMAND (code 352) the radio connector C is part of the COMAND wiring harness in the form of an intermediate connector (must be exposed).

A2	Radio
D	Connector for adapter wiring harness

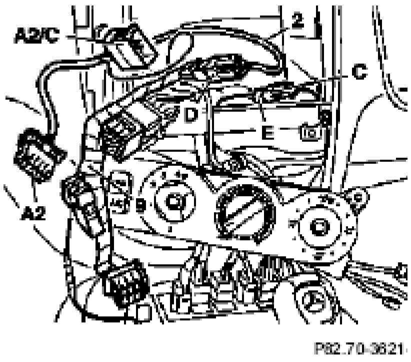


Fig. 386: Identifying Radio And Connector For Adapter Wiring Harness

i Depending on vehicle equipment (vehicles without navigation system Audio 30 APS or COMAND or with navigation system) the connection of the telephone antenna differs.

A Only for models without navigation system

16.1 On vehicles without navigation system the antenna connection cable (ANT) is connected directly to the black (sw) connector of the antenna cable (19) and connected to the GSM 1800 MHz compensator (A28/3).

A Only for models with navigation system

16.2 On vehicles with navigation system the antenna cable (ANT) is connected to the antenna diplexer (A2/57). The antenna connection cable (19/1) is connected to the red (rt) socket at the antenna diplexer

(A2/57) and to the GSM 1800 MHz compensator (A28/3).

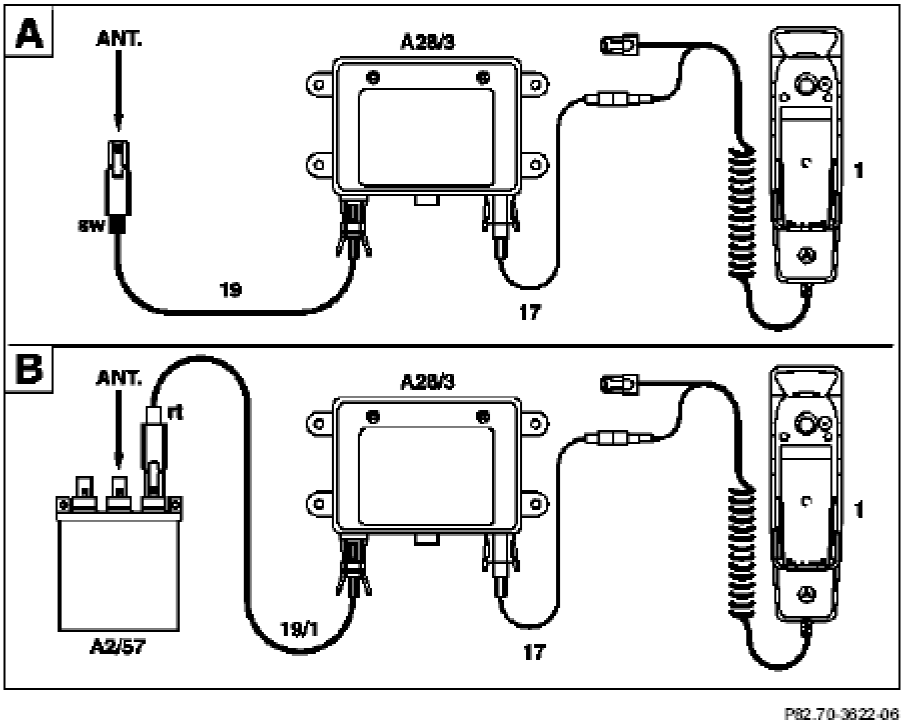


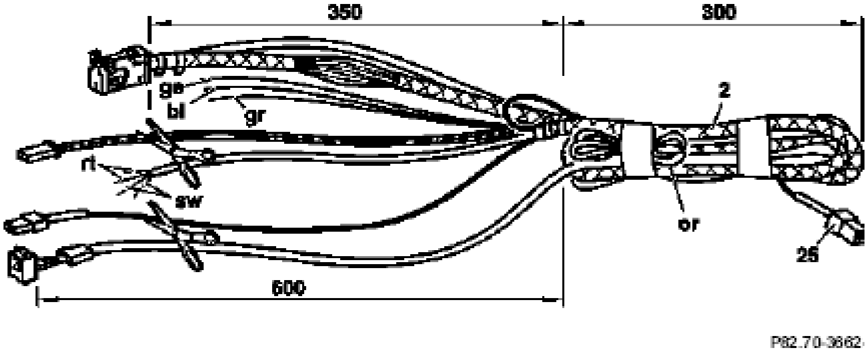
Fig. 387: Identifying

17 The GSM 1800 MHz compensator is connected to the antenna cable (17) at the mount for the portable CTEL (1).

RETROFIT WIRING HARNESS - AZ82.70-P-0001-04GHH

Model 163 as of 1.9.00 for Nokia 6090 fixed installation cellular telephone

1. Prepare telephone wiring harness (2) as shown in figure.
2. Tie back audio line-out cable with 4-pin connector (25) (is not required).
3. Expose two red (rt) and two black (sw) cables.
4. Cut off the two 2-pin connector housings of microphone speaker to the size of 350 mm as shown in figure and expose the leads (the are provided with a new connector housing).



bl Blue lead (circuit 15)
ge Yellow lead (mute)
gr Gray lead (circuit 58d)
or Orange lead for automatic antenna (tie back, not required)
rt Two red leads circuit 30)
sw Two black leads (circuit 31)

Fig. 388: Identifying Telephone Wiring Harness

5. Unlock catch (arrows) of connector (21) one detent.
6. Fit cable terminals (22) to the red (rt) leads and insert into chambers 3 and 9 of the connector (21).
7. Fit cable terminals (22) to the black (sw) leads and insert into chambers 4 and 6.
8. Insulate orange cable and tie back (is not required).
9. Fit cable terminal (22) to blue (bl) lead and insert into chamber 5.
10. Fit cable terminal (22) to yellow (ge) lead and insert into chamber 2.
11. Fit cable terminal (22) to gray (gr) lead and insert into chamber 7.
12. Lock connector (21).

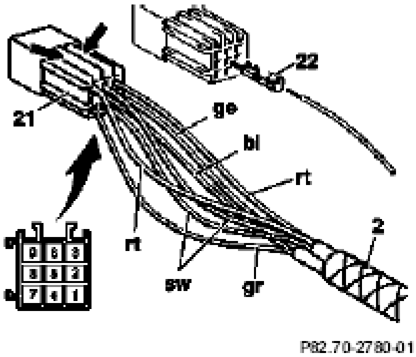


Fig. 389: Locating Catch Of Connector

13. Fit flat connector (52) to screening (sch) of microphone cable and insert into chamber A (on right) of green connector housing (50).
14. Fit flat connector (52) to white cable of internal conductor of microphone (ws) and insert into chamber B (on left) of green connector housing (50).
15. Close connector housing with the catch (51).

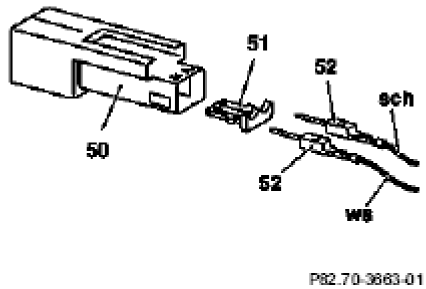


Fig. 390: Identifying Flat Connector, Connector Housing & Catch

16. Fit flat receptacle (57) to the back cable (sw) and insert into chamber A (on left) of the black receptacle housing (55).
17. Fit flat receptacle (57) to the black/white cable (sw/ws) and insert into chamber B (on right) of the black receptacle housing (55).
18. Close receptacle housing (55) with catch (56).

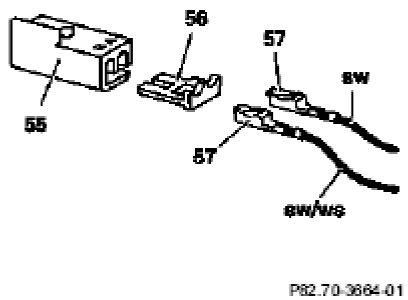


Fig. 391: Identifying Flat Receptacle, Receptacle Housing & Catch

19. Insert wiring harness (2) into instrument panel working from the glove compartment.

 i The tied-back part must be placed below the strut (arrows) at the glove compartment.

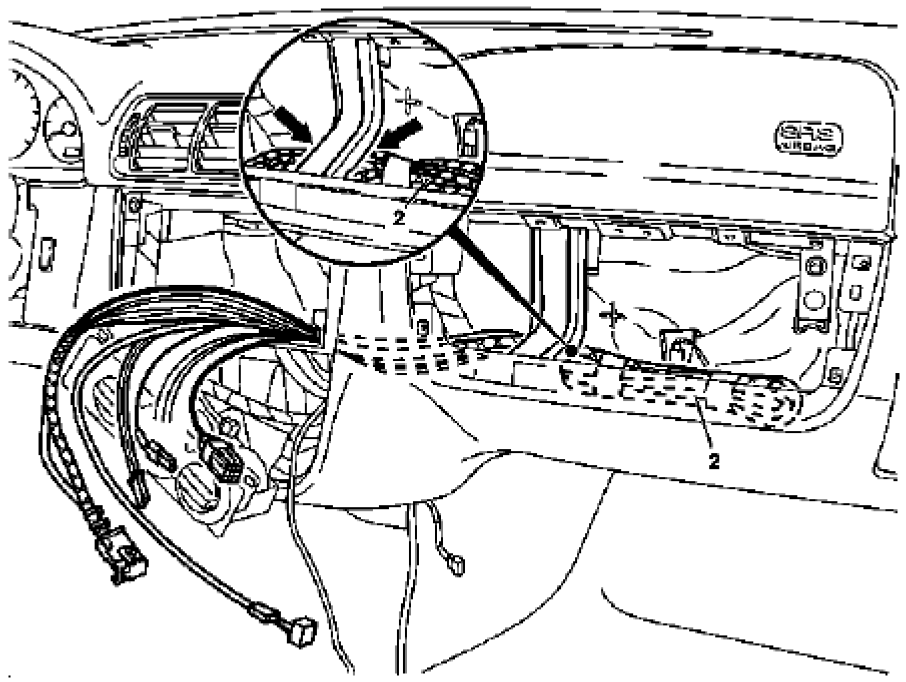


Fig. 392: Locating Wiring Harness

20. Connect telephone wiring harness (2) to adapter wiring harness (9).
21. Check fuse (23) (a 10A fuse should be present).

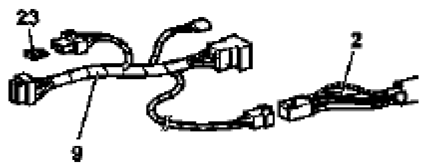


Fig. 393: Identifying Telephone Wiring Harness To Adapter Wiring Harness Connection & Fuse

22. Connect adapter wiring harness (9) to radio wiring harness and insert into radio slot.
23. Place microphone cable of telephone wiring harness (2) into radio slot.

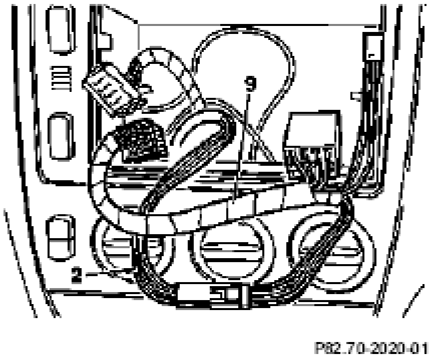


Fig. 394: Identifying Telephone & Adapter Wiring Harnesses

24. Route connection cable of telephone wiring harness (2) to telephone handset in cockpit as shown in figure.

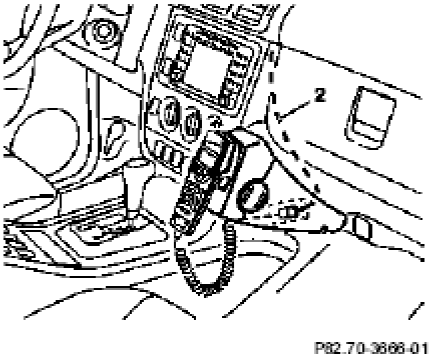


Fig. 395: Identifying Telephone Wiring Harness & Telephone Handset In Cockpit

RETROFIT D-NETWORK CELL PHONE - AZ82.70-P-0001A

MODEL 163 up to 30.11.99

Nokia 3110 portable cellular telephone

System illustration for installation

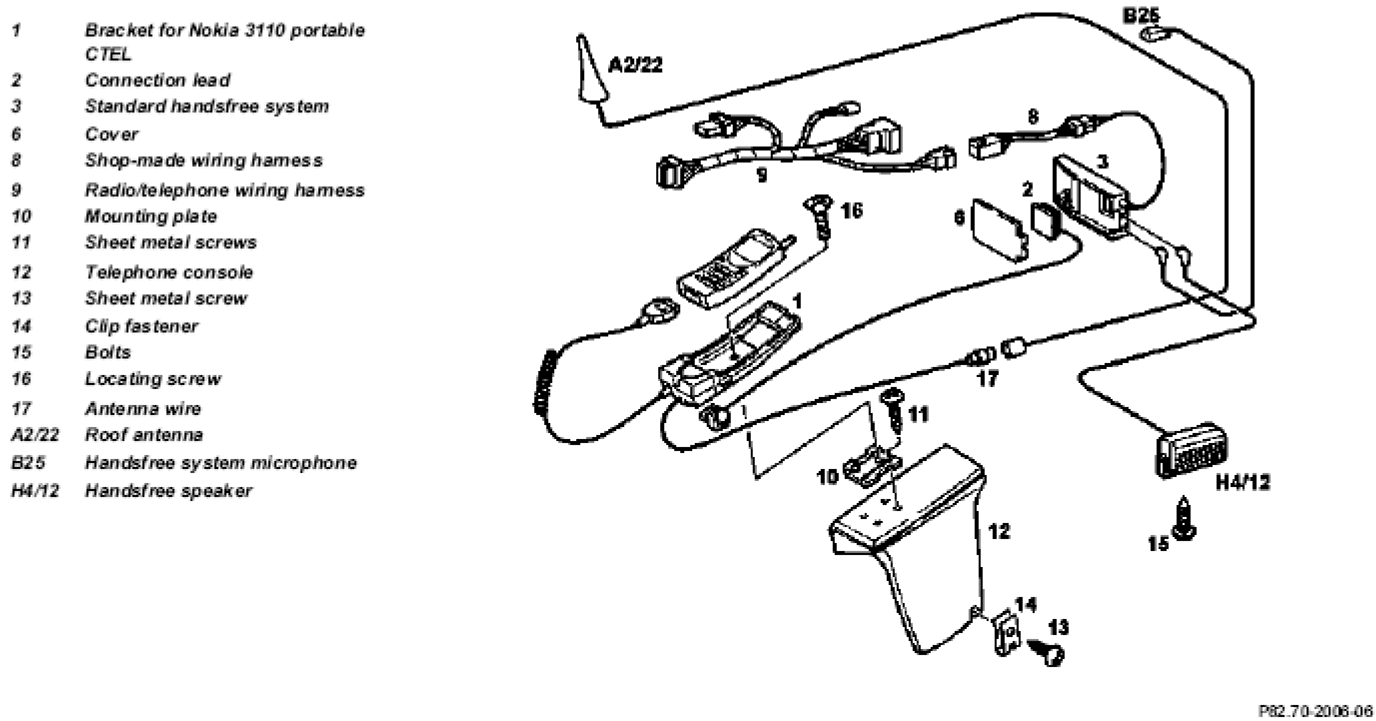


Fig. 396: Identifying D-Network Cell Phone Components

	Removal		
1 AR	Disconnect ground cable of battery		**AR54.10-P-0003A**
2	Remove radio		
3	Remove stowage compartment below radio		
4	Remove stowage compartment in center armrest		
5	Remove wooden cover from shift lever		
6	Remove cover below right instrument panel		
7	Remove A-pillar paneling at top right		
8	Tie out D-net antenna lead	i Tied back in radio shaft.	
	Install		
9	Install holder on telephone console		**AZ82.70-P-0001-01A**
10	Installing hands free		AZ82.70-P-0001-02A

	system microphone		
11	Install loudspeaker		AZ82.70-P-0001-03A
12	Modify wiring harness and install		AZ82.70-P-0001-04A
13	Install D-net antenna on roof	i See assembly instructions from Kathrein company Install antenna without modification.	
14	Check portable cellular telephone for proper function		
15	Fit parts to vehicle 7-1		

Parts ordering notes

Part no.	Designation	Quantity
B6 787 4155	Portable cellular telephone, Nokia 3110	1
B6 787 4160	Motor vehicle installation kit, Nokia CARK-74	1
B6 788 0128	Antenna radiator, Kathrein	1
B6 787 4162	Wiring harness assy.	1
B6 787 6794	Telephone console, sand, left-hand steering	1
B6 787 6804	Telephone console, sand, right-hand steering	1
B6 787 6798	Telephone console, gray, left-hand steering	1
B6 787 6808	Telephone console, gray, right-hand steering	1
Group 82 (see EPC)	Packard connector housing	1
Group 82 (see EPC)	Packard terminals	5
N914 129 005 000	Screw	2
Commercially available	Foam rubber 250 x 260 x 20	1
A000 989 92 71	Special glue	1

RETROFITTING D-NETWORK CELL PHONE - AZ82.70-P-0001D

MODEL 163 as of 1.12.99 up to 31.8.00

Nokia 3110 portable cellular telephone

System illustration for installation

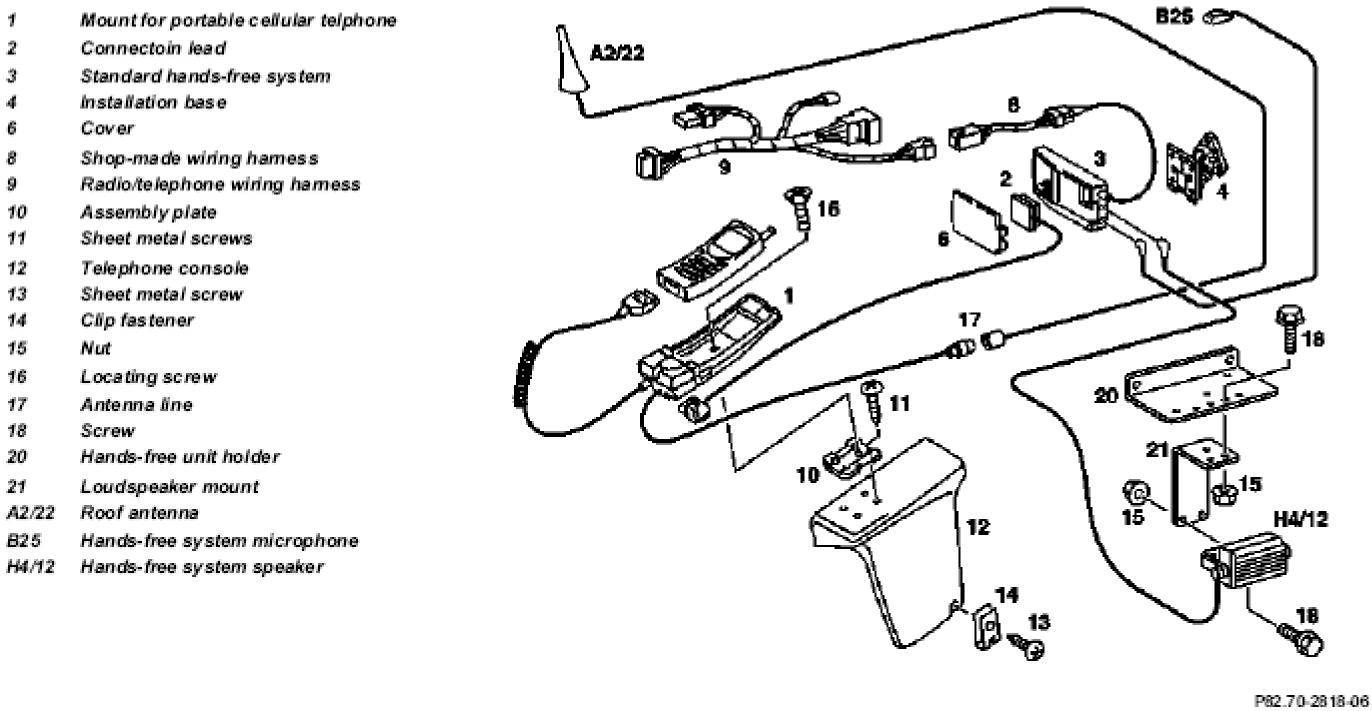


Fig. 397: Identifying D-Network Cell Phone Components

	Removal		
1 AR	Disconnect ground cable of battery		**AR54.10-P-0003A**
2	Remove radio		
3	Remove stowage compartment below radio		
4	Remove stowage compartment in center armrest		
5	Remove wooden cover from shift lever		
6	Remove cover below instrument panel on right		
7	Remove automatic A/C control panel		
8	Remove A-pillar paneling at top right		
9	Tie out D-network antenna lead	i Tied back in radio shaft.	
	Installation		
10	Install holder on		**AZ82.70-P-0001-01A**

	telephone console		
11	Install hands-free microphone		AZ82.70-P-0001-02A
12	Modify wiring harness and install		**AZ82.70-P-0001-04D**
13	Install loudspeaker		AZ82.70-P-0001-03D
14	Install D-net antenna on roof	i See installation instructions from the Kathrein company. Install antenna without modification.	
15	Retrofit antenna lead	i Only on vehicles with Audio 30 APS radio	AZ82.70-P-0002-01A
16	Check portable cellular telephone for proper function		
17	Reassemble vehicle, 8-1		

Parts ordering notes

Part no.	**Designation**	**Quantity**
B6 787 41 55	Nokia 3110 portable cellular telephone	1
B6 787 41 60	Motor vehicle installation kit, Nokia CARK-74	1
B6 788 01 28	Antenna radiator, Kathrein	1
B6 787 41 62	Wiring harness assy.	1
B6 788 03 46	Telephone console, anthracite, left-hand steering	1
B6 788 03 49	Telephone console, anthracite, right-hand steering	1
B6 788 03 47	Telephone console, medium orion-gray, left-hand steering	1
B6 788 03 50	Telephone console, medium orion-gray, right-hand steering	1
B6 788 03 48	Telephone console, java, left-hand steering	1
B6 788 03 51	Telephone console, java, right-hand steering	1
A035 545 0328	Packard connector housing	1
A035 545 1128	Packard terminals	5
N007 985 004 107	Screw	5
N304 032 004 002	Nut	5
commercially available	Foam rubber	as required

B6 788 03 52	Hands-free unit holder	1
B6 788 03 53	Loudspeaker mount	1
A163 540 02 13	Antenna lead (adapter lead on Audio 30 APS radio)	1
A000 989 92 71	Special glue	as required

RETROFIT D-NETWORK CELL PHONE - AZ82.70-P-0001GH

MODEL 163 as of 1.10.01

for D-net portable CTEL only

System illustration for installation

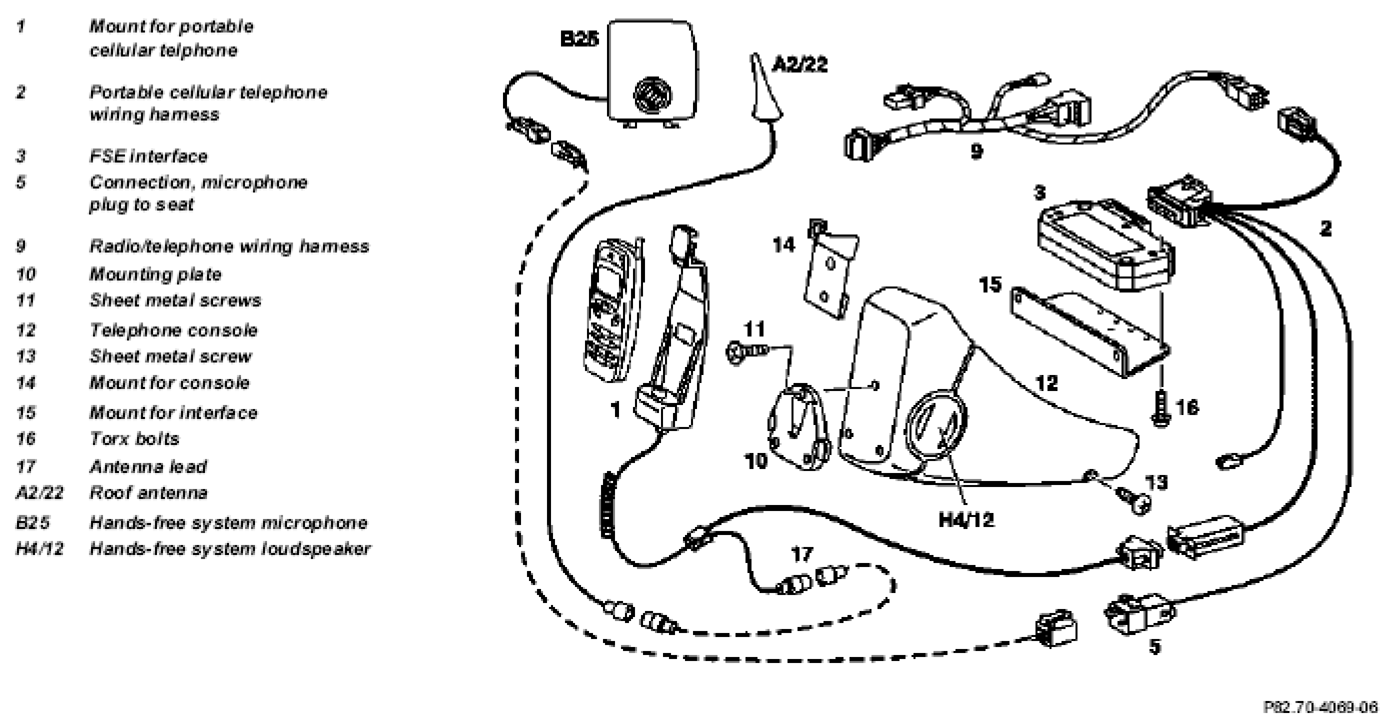


Fig. 398: Identifying D-Network Cell Phone Components

	Remove		
1 ☞AR	Disconnect ground cable of battery		**AR54.10-P-0003A**
2	Remove radio or COMAND		
3	Remove stowage compartment below radio		
4	Remove cover from radio		

5	Remove air conditioning pushbutton control module		
6	Remove overhead control panel microphone flap		
7	Tie antenna lead	i Tied back in radio shaft	
	Install		
8	Retrofit telephone cable harness		**AZ82.70-P-0001-04G**
9	Retrofit hands-free system microphone	i Mount in overhead control panel.	AZ82.70-P-0001-02GH
10	Retrofitting telephone console		**AZ82.70-P-0001-01G**
11	Install antenna on roof i See installation instructions from the Kathrein company.		
12	Check portable cellular telephone for proper function		
13	Complete vehicle (following steps 6 to 1)		

Parts ordering notes

Part no.	**Designation**	**Quantity**
B6 787 57 01	Electro kit parts set (for D-net only)	1
B6 788 04 54	Portable cellular telephone console anthracite LHS	1
B6 788 04 59	Portable cellular telephone console anthracite RHS	1
B6 788 04 55	Portable cellular telephone console orion gray middle LHS	1
B6 788 04 58	Portable cellular telephone console orion gray middle RHS	1
B6 788 04 56	Portable cellular telephone console java LHS	1
B6 788 04 57	Portable cellular telephone console java RHS	1
B6 682 86 09	Cover (with microphone), color java	1
B6 682 86 10	Cover (with microphone), color light gray	1

B6 787 58 15	Telephone bracket, Nokia 5110/6110	1
B6 787 58 13	Telephone bracket, Nokia 6210	1
B6 787 58 17	Telephone bracket, Nokia 6310/631 0i	1
B6 787 58 14	Telephone bracket, Siemens S/C/M35	1
B6 787 58 12	Telephone bracket, Siemens SL45	1
B6 788 01 28	Kathrein radiator-type antenna	as required

RETROFIT PERMANENTLY INSTALLED GSM NETWORK CAR PHONE - AZ82.70-P-0002A

MODEL 163 up to 30.11.99

Nokia 6081 permanently installed telephone

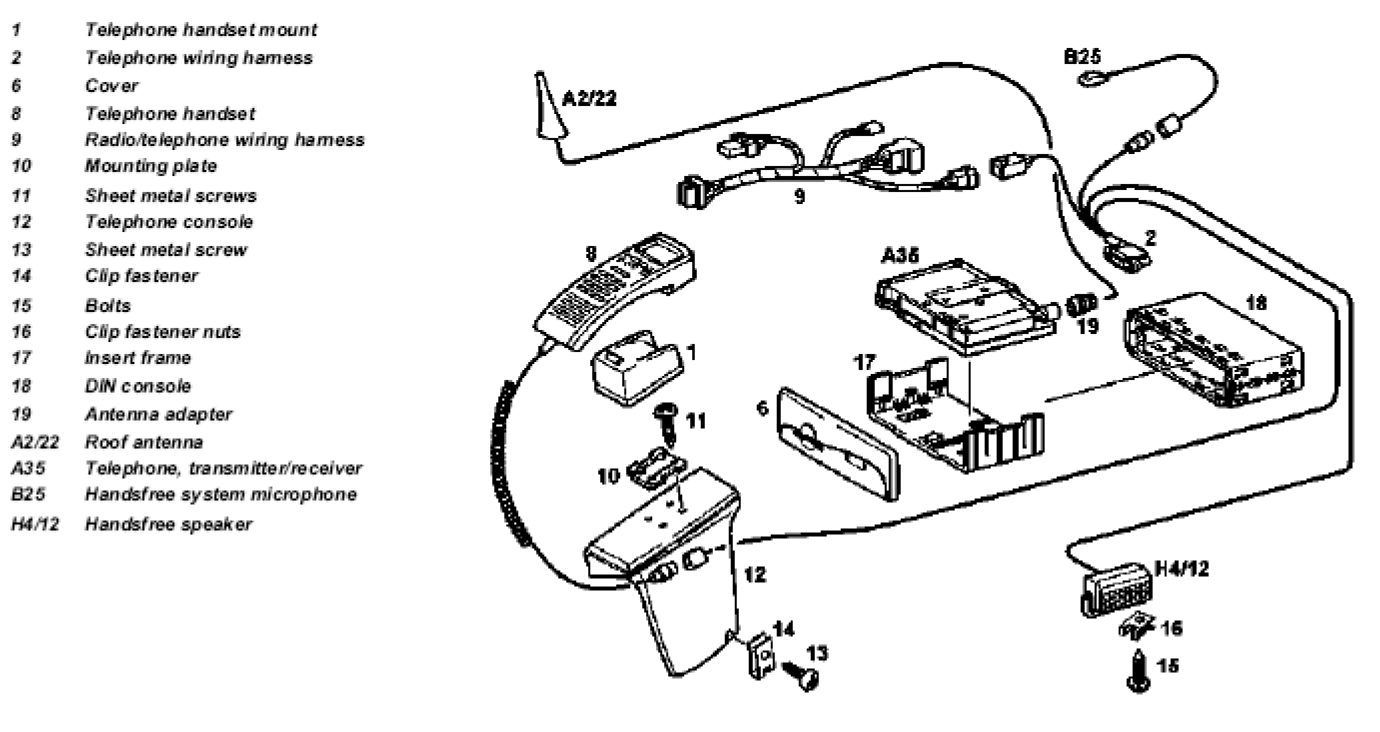


Fig. 399: Identifying Permanently Installed GSM Network Car Phone Components

	Removal		
1 AR	Disconnect ground cable of battery		AR54.10-P-0003A
2	Remove radio		
3	Remove stowage compartment	i No longer required.	

	below radio		
4	Remove stowage compartment in center armrest		
5	Remove wooden cover from shift lever		
6	Remove A-pillar paneling at top right		
7	Remove cover below right instrument panel		
8	Tie out D-net antenna lead	[i] Tied back in radio shaft.	
⌧	**Installation**		
9	Modify wiring harness and install		AZ82.70-P-0001-04B
10	Installing handsfree system microphone		AZ82.70-P-0001-02A
11	Install loudspeaker		AZ82.70-P-0001-03B
12	Install holder on telephone console		AZ82.70-P-0001-01B
13	Installing transmitter/receiver		AZ82.70-P-0001-06A
14	Install D-net antenna on roof	[i] See assembly instructions from Kathrein company Install antenna without modification.	
15	Carry out function check		
16	Fit parts to vehicle 7-1		

Parts ordering notes

Part no.	**Designation**	**Quantity**
B6 787 4158	Permanently installed unit, Nokia 6081	1
B6 787 4161	Vehicle installation kit, Nokia KNME-2 (DIN/ISO installation frame)	1
B6 788 0128	Antenna radiator, Kathrein	1
A000 823 00 77	Antenna adapter, mini UHF/SAP	1
B6 787 4162	Wiring harness assy.	1
B6 787 6794	Telephone console, sand, left-hand steering	1
B6 787 6804	Telephone console, sand, right-hand steering	1
B6 787 6798	Telephone console, gray, left-hand	1

	steering	
B6 787 6808	Telephone console, gray, right-hand steering	1
Group 82 (see EPC)	Packard connector housing	1
Group 82 (see EPC)	Packard terminals	5
N914 127 004 204	Sheet metal screw	2
A002 994 11 45	Clip fastener	2
A000 989 92 71	Special glue	1

RETROFIT PERMANENTLY INSTALLED GSM NETWORK CAR PHONE - AZ82.70-P-0002C

MODEL 163 as of 1.12.99 up to 31.8.00

fixed installation Nokia 6090 CTEL

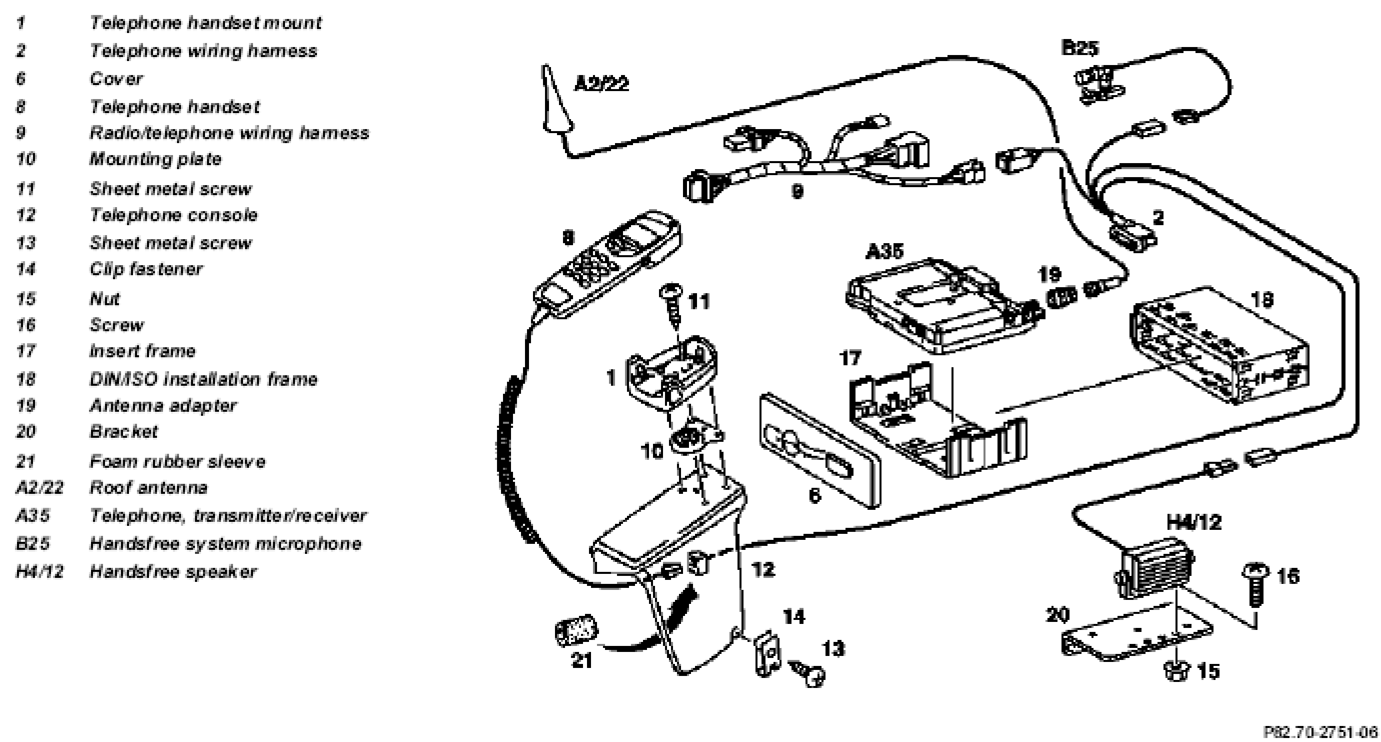


Fig. 400: Identifying Permanently Installed GSM Network Car Phone Components

	Removal		
1 AR	Disconnect ground cable of battery		AR54.10-P-0003A
2	Remove radio		
3	Remove stowage compartment below radio	i No longer required.	

4	Remove stowage compartment in center armrest		
5	Remove wooden cover from shift lever		
6	Remove A-pillar paneling at top right		
7	Remove glove compartment		
8	Remove automatic A/C control panel		
9	Remove cover below right instrument panel		
10	Tie out D-net antenna lead	i Tied back in radio shaft.	
⌧	**Installation**		
11	Modify wiring harness and install		**AZ82.70-P-0001-04C**
12	Installing handsfree system microphone		AZ82.70-P-0001-02C
13	Install loudspeaker		AZ82.70-P-0001-03C
14	Install holder on telephone console		**AZ82.70-P-0001-01C**
15	Installing transmitter/receiver		AZ82.70-P-0001-06C
16	Install D-net antenna on roof	i See assembly instructions from Kathrein company Install antenna without modification.	
17	Retrofit antenna lead	i Only on vehicles with Audio 30 APS radio	AZ82.70-P-0002-01A
18	Carry out function check	i Set illumination to **"User defined"** and volume to **"very loud"** .	
19	Reassemble vehicle 9-1		

Parts ordering notes

Part no.	**Designation**	**Quantity**
B6 682 94 14	Nokia 6090 permanently installed telephone	1
B6 682 94 13	Vehicle installation kit (DIN/ISO installation frame)	1
B6 788 01 28	Antenna radiator, Kathrein	1

A000 823 0077	Antenna adapter, mini UHF/SAP	1
B6 682 94 18	Wiring harness assy.	1
B6 788 03 46	Telephone console, anthracite, left-hand steering	as req.
B6 788 03 49	Telephone console, anthracite, right-hand steering	as req.
B6 788 03 47	Telephone console, medium orion gray, left-hand steering	as req.
B6 788 03 50	Telephone console, orion gray, medium, right-hand steering	as req.
B6 788 03 48	Telephone console, java, left-hand steering	as req.
B6 788 03 51	Telephone console, java, right-hand steering	as req.
KG82 (see EPC)	Packard connector housing	1
Group 82 (see EPC)	Packard terminals	7
N007 985 004 107	Screw	2
N304 032 004 002	Nuts	2
B6 788 03 52	Bracket	1

RETROFITTING PERMANENTLY INSTALLED D-NETWORK CAR PHONE - AZ82.70-P-0002GH

MODEL 163 as of 1.9.00 up to 30.9.01 except CODE (352a) COMAND operating and display system

Nokia 6090 permanently installed telephone

- 2 *Telephone wiring harness*
- 6 *Panel*
- 8 *Telephone set*
- 9 *Radio/telephone wiring harness*
- 12 *Telephone console*
- 13 *Plastic screw*
- 14 *Mount for console*
- 17 *Insert frame*
- 18 *DIN/ISO installation frame*
- 19 *Antenna adapter*
- 20 *Antenna adapter cable*
- 21 *Foam rubber grommet*
- A2/22 *Roof antenna*
- A2/57 *GPS and telephone antenna splitter (only on vehicles with Audio 30 APS)*
- A35 *Telephone transmitter/receiver*
- B25 *Hands-free system microphone*
- H4/12 *Hands-free speaker*

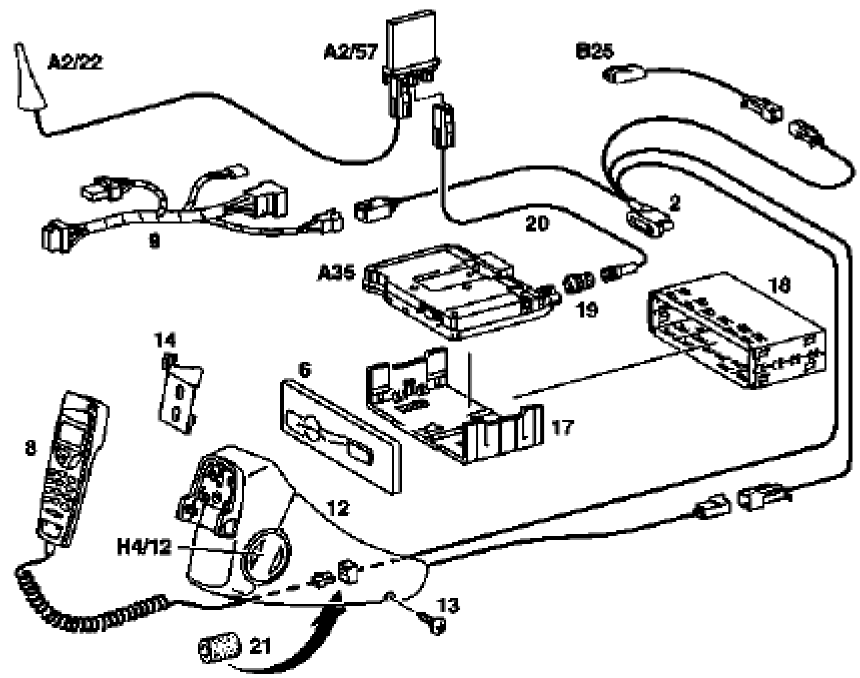


Fig. 401: Identifying Permanently Installed D-Network Car Phone Components

	Removal		
1 AR	Disconnect ground cable of battery		**AR54.10-P-0003A**
2	Remove radio		
3	Remove stowage compartment below radio	i No longer required.	
4	Remove cover from radio i Remove cover from radio.		
5	Remove AAC pushbutton control module		
6	Tie out D-network antenna lead	i Tied back in radio shaft	
	Installation		
7	Modify wiring harness and install		**AZ82.70-P-0001-04GHH**
8	Installing hands-free system microphone	Vehicles up to 31.12.00. Vehicles as of 1.1.01.	AZ82.70-P-0001-02E AZ82.70-P-0001-02GH
9	Mount holder on telephone console and install	i Retrofit telephone console	AZ82.70-P-0001-01GGH

10	Installing transmitter/receiver		AZ82.70-P-0001-06GH
11	Install D-network antenna on roof	[i] See assembly instructions from Kathrein company Install antenna without modifying.	
12	Retrofit antenna lead	[i] Only on vehicles with Audio 30 APS radio	AZ82.70-P-0002-01A
13	Carry out operational check	[i] Set illumination to **"User defined"** and volume to **"very loud"** .	
14	Fit remaining parts 5-1 to vehicle		

Parts ordering notes

Part no.	**Designation**	**Quantity**
B6 682 94 14	Permanently installed unit, Nokia 6090 (installation kit)	1
B6 682 94 13	Installation frame, Nokia 6090 (DIN/ISO frame)	1
A035 545 0328	Connector housing (9-pin)	1
A035 545 1128	Connector (terminal)	7
A036 545 4128	Connector housing (2-pin, green) (for microphone)	1
A034 545 0928	Flat plug (for microphone)	2
A000 545 5073	Lock (for microphone)	1
A010 545 2126	Connector sleeve housing (2-pin, black) (for loudspeaker)	1
A010 545 6626	Flat socket sleeve (for loudspeaker)	2
A000 545 4973	Lock (for loudspeaker)	1
A000 823 0077	Antenna adapter (straight)	1
B6 682 8613	Antenna lead	1
B6 682 8612	Antenna lead	1
B6 788 0390	FA console LHS (anthracite)	1
B6 788 0389	FA console LHS (orion gray middle)	1
B6 788 0391	FA console LHS (java)	1
B6 788 0387	FA console RHS (anthracite)	1
B6 788 0386	FA console RHS (orion gray middle)	1

B6 788 0388	FA console RHS (java)	1
A005 997 9390	Tie strap	5
B6 682 8607	Wiring harness (tel. on radio)	1
B6 682 8608	CTEL antenna	1
B6 682 8609	Cover (with microphone), color: java (as of 01/01)	1
B6 682 8610	Cover (without microphone) color: light gray (as of 01/01)	1
B6 682 8611	Active microphone in design function housing (up to 12/00)	1

RETROFIT WIRING HARNESS OF HANDS-FREE SYSTEM - AZ82.70-P-0005-02GH

1. Expose connector for telephone handset (A34) in radio shaft.

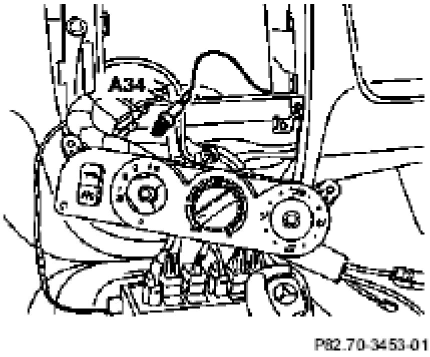


Fig. 402: Identifying Telephone Handset Connector (A34)

2. Connect connector (8) to interface (4).
3. Connect antenna for telephone handset (A34).
4. Connect connection line (5) to interface (4).

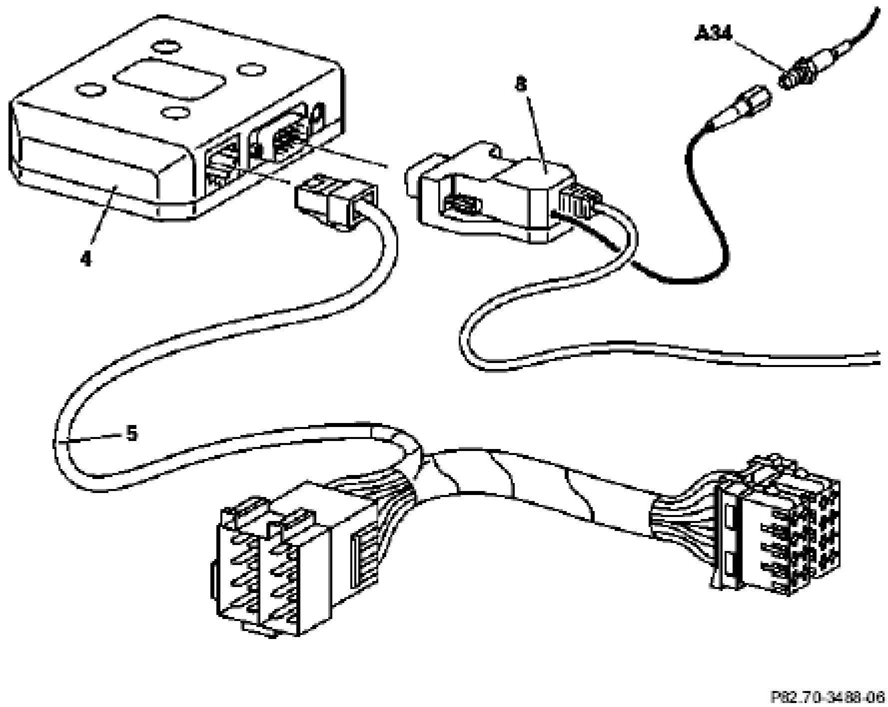


Fig. 403: Identifying Connector, Connection Line & Interface

5. Apply special glue to rear of microphone (arrow) and glue hands-free system microphone (B25) included in installation kit to headliner.

   ⓘ Align microphone so that pickup opening points towards driver.

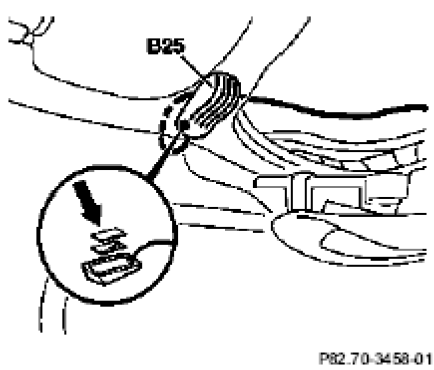


Fig. 404: Locating Rear Of Microphone & Hands-Free System Microphone (B25)

6. Glue microphone lead behind headliner as shown in figure and along right A-pillar below instrument panel to radio shaft.
7. Connect all control and operation modules and connect battery for checking proper function of telephone.

   ⓘ Avoid error messages from unconnected control modules.

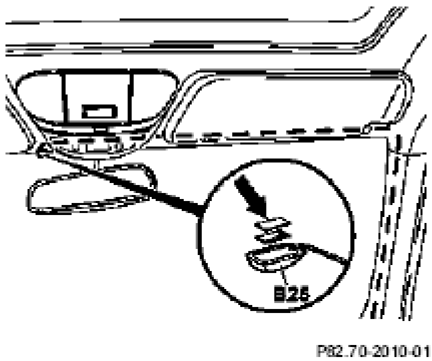


Fig. 405: Locating Microphone Lead Behind Headliner

8. Insert test telephone in portable cellular telephone holder and set microphone sensitivity with "Micro" adjustment screw (arrow) on interface box (4).

   i Adjust so that feedback and whistling are not audible and the volume is optimum for speaking and listening.

9. Disconnect battery again.

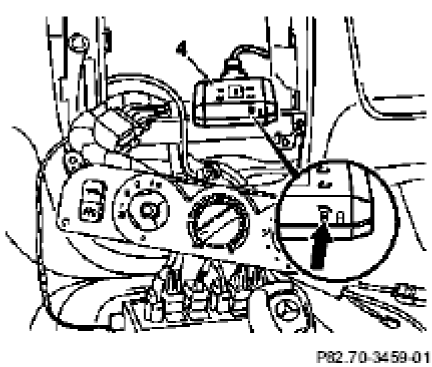


Fig. 406: Identifying Microphone Sensitivity Adjustment Screw & Interface Box

10. Fasten interface box (4) and connection leads at rear in radio shaft as shown in figure with double-sided adhesive tape.

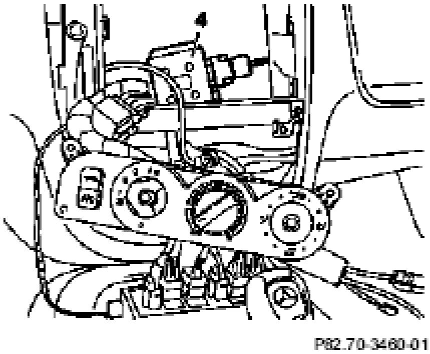


Fig. 407: Identifying Interface Box

RETROFITTING HANDS-FREE SYSTEM - AZ82.70-P-0005GH

MODEL 163 as of 1.10.99

for Mercedes-Benz FSE hands-free system

1 Portable cellular telephone mount (for special portable cellular telephone)
2 Base bracket
3 Sheet metal screws (3 each)
4 Interface box
5 Connection lead (not VDA)
12 Console
13 Screw
15 Mount
B25 Hands-free system microphone

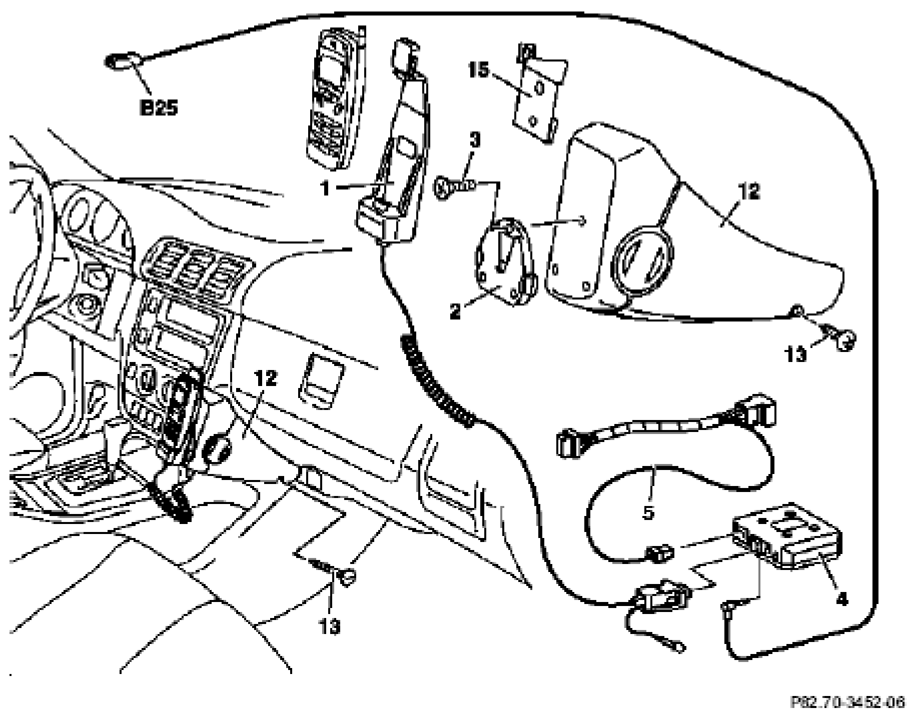


Fig. 408: Identifying Hands-Free System Components

	Removal		
1	Connect quiescent current retention unit		***WH58.30-Z-1012-09A**
Danger!	**Risk of explosion** from	No fire, sparks, naked	**AS54.10-Z-0001-01A**

	gas. **Risk of poisoning and caustic burns** from swallowing battery electrolyte. **Risk of injury** from caustic burns to eyes and skin from battery electrolyte or from handling damaged lead-acid batteries	flames or smoking. Wear acid-resistant gloves, clothing and glasses. Pour battery electrolyte only into suitable and appropriately marked containers.	
2	Disconnect ground cable of battery		
AR			**AR54.10-P-0003A**
	Notes on battery	All models.	**AH54.10-P-0001-01A**
3	Remove overhead control panel		
4	Remove radio or COMAND		
5	Remove stowage compartment below radio		
6	Remove cover from radio		
7	Remove air conditioning pushbutton control module		
	Installation		
8	Retrofitting portable cellular telephone mount for hands-free system		AZ82.70-P-0005-01GH
9	Retrofitting hands-free system wiring harness		**AZ82.70-P-0005-02GH**
10	Install D-net antenna on roof	i See installation instructions from the Kathrein company. Install antenna without modification.	
11	Retrofit antenna lead	i Only on vehicles with Audio 30 APS radio	AZ82.70-P-0002-01A
12	Retrofitting telephone console	i Is fastened to center console with mount (15) and with screw (13).	
13	Reassemble vehicle 7-1		
14	Carry out start-up and function test	Check telephone for proper functioning according to operating instructions.	

Commercially available tools

Number	Designation
WH58.30-Z-1012-09A	Quiescent current retention unit

Parts Ordering notes

Part no.	Designation	Quantity
B6 787 58 07	Siemens S10D portable cellular telephone mount	as required
B6 787 58 06	Siemens S25 portable cellular telephone mount	as required
B6 787 58 05	Nokia 5110, 6110, 6130, 6150 portable cellular telephone mount	as required
B6 787 58 04	Nokia 3110, portable cellular telephone mount	as required
B6 787 58 08	Nokia 7110 portable cellular telephone mount	as required
B6 787 58 09	Nokia 6210 portable cellular telephone mount	as required
B6 787 58 10	Siemens S/C/M35 portable cellular telephone mount	as required
B6 682 86 16	Antenna adapter (only if required)	1
B6 787 58 02	Basic set without VDA	1
Accessories	Telephone side (order according to vehicle equipment)	1
A000 989 92 71	Special glue	1
B6 788 01 28	Kathrein radiator-type antenna	as required

RETROFITTING PORTABLE CTEL - AZ82.70-P-0006GH

MODEL 163 as of 1.9.00 up to 30.9.01

Nokia 51 xx and 61 xx portable cellular telephone

System illustration for installing telephone and GPS

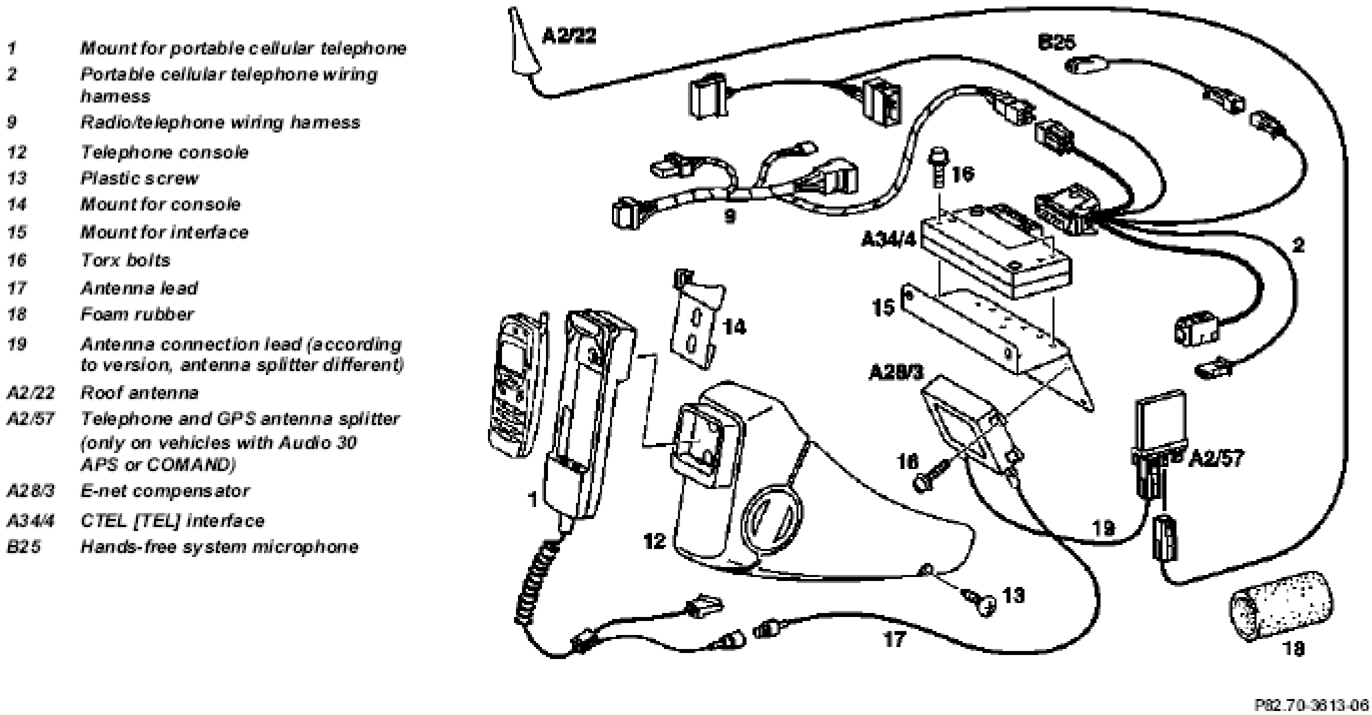


Fig. 409: Identifying Portable CTEL Components

	Removal		
1 AR	Disconnect ground cable of battery		AR54.10-P-0003A
2	Remove radio or COMAND		
3	Remove stowage compartment below radio		
4	Remove cover from radio		
5	Remove air conditioning pushbutton control module		
6	Remove overhead control panel		
7	Tie antenna lead	i Tied back in radio shaft	
	Install		
8	Covering fiber optic cable	**Do not kink or stretch D2B fiber optic cable.** i Install caps on fiber optic cable connector and	

☞AR		equipment connection.	**AR82.95-P-0005-01A**
9	Retrofit fiber optic cable wiring harness	Vehicles **without** CD player with changer (code 819). Vehicles **with** CD player with changer (code 819).	**AN82.70-P-0002-01GH** **AN82.70-P-0002-01GHH**
10	Retrofit telephone cable harness		**AZ82.70-P-0001-04GH**
11	Installing hands-free system microphone	Vehicles up to 31.12.00. Vehicles as of 1.1.01.	AZ82.70-P-0001-02E AZ82.70-P-0001-02GH
12	Retrofitting telephone console		AZ82.70-P-0001-01GH
13	Install antenna on roof	i See assembly instructions from Kathrein company Install antenna without modifying.	
14	Retrofit antenna lead	i Only on vehicles with Audio 30 APS radio	AZ82.70-P-0002-01A
15	Check portable cellular telephone for proper function	i Perform version coding (telephone) with STAR DIAGNOSIS.	
16	Reassemble vehicle 6-1		

Parts ordering notes

Part no.	Designation	Quantity
B6 682 94 19	Telephone (portable cellular telephone), Nokia 6150	1
MA203 820 04 51	Mount (portable cellular telephone)	1
A203 820 32 26	Control module (portable cellular telephone)	1
A203 820 39 26	Compensator	1
B6 682 86 00	Mount (compensator)	1
N000 000 000 521	Screw (St 4.2x13)	4
B6 682 86 01	Wiring harness (portable cellular telephone)	1
B6 682 86 02	Wiring harness (LWL1 without CD player)	1
B6 682 86 03	Wiring harness (LWL2 with CD changer)	1

B6 682 86 04	Lead (for antenna, on vehicles without Audio APS or COMAND)	1
B6 682 86 05	Lead (for antenna, on vehicles with Audio APS or COMAND)	1
B6 682 86 06	Lead (for antenna)	1
B6 788 03 57	Portable cellular telephone console anthracite LHS	1
B6 788 03 55	Portable cellular telephone console anthracite RHS	1
B6 788 03 54	Portable cellular telephone console orion gray middle LHS	1
B6 788 03 58	Portable cellular telephone console orion gray middle RHS	1
B6 788 03 59	Portable cellular telephone console java LHS	1
B6 788 03 56	Portable cellular telephone console java RHS	1
B6 682 86 07	Wiring harness (telephone on radio)	1
B6 682 86 08	CTEL antenna	1
B6 682 86 09	Cover (with microphone), color: java (as of 01/01)	1
B6 682 86 10	Cover (without microphone) color: light gray (as of 01/01)	1
B6 682 86 11	Active microphone in design function housing (up to 12/00)	1

REMOVAL & INSTALLATION

INSTALLING LARGER WASHER FLUID RESERVOIR - SM82.35-P-0002GH

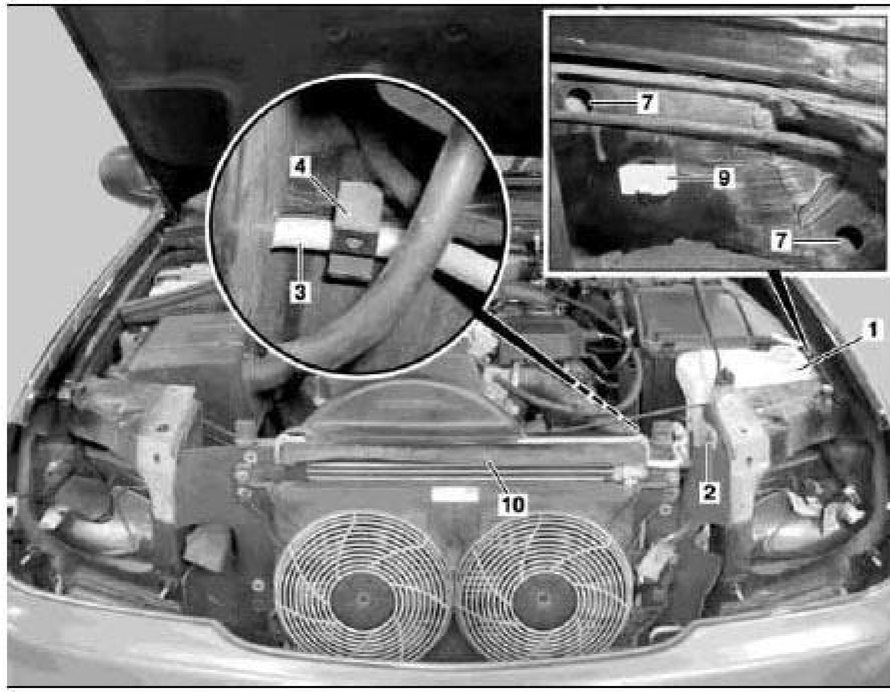
MODELS 163.113/136/154/172

with 5 I container

The 5 I washer fluid reservoir has been replaced by a 7.6 I container. If a 5 l container is replaced, then the following modifications must be made.

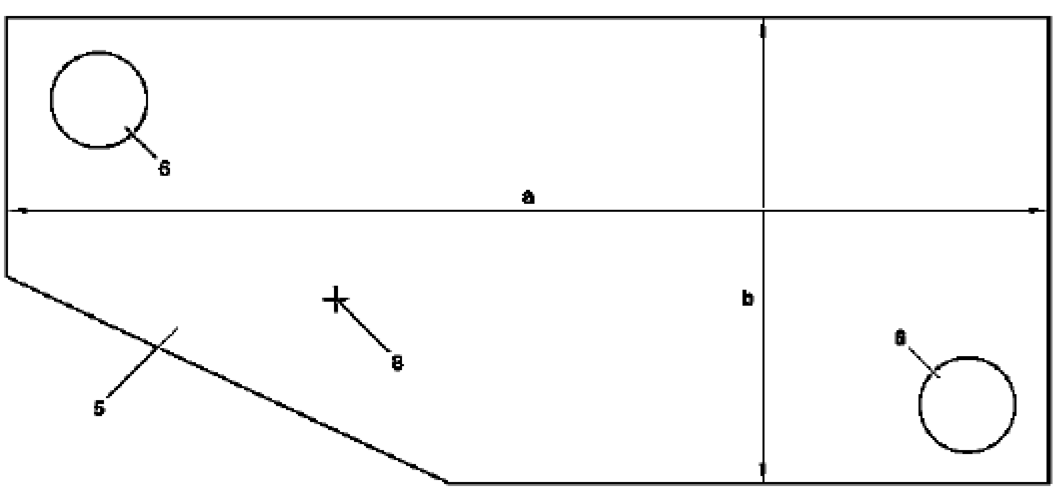
i **This modification should ONLY be performed following a customer complaint.**

1 *Washing water reservoir*
2 *Bolt*
3 *Hose*
4 *Clip*
7 *Hole*
9 *Clip*
10 *Cooling module*



P82.35-2198-06

Fig. 410: Identifying Larger Washer Fluid Reservoir Components



P82.35-2199-08

5 *Template*
6 *Holes*
8 *Bore*
a *200 mm*
b *90 mm*

Fig. 411: Larger Washer Fluid Reservoir Component Locations

Operation no. of operation texts or standard texts and flat rates

Category	Op. no.	Operation text	Time	Acc. no.	Code
P	023591	INSTALLING	023WU/1.9hrs.	86 011 04	-

		LARGER CONTAINER FOR WINDSHIELD WASHER SYSTEM			

	Remove		
1	Remove radiator crossmember		**AR62.30-P-2300GH**
2	Drain the washer fluid reservoir		**Fig. 189**
3	Remove container (1)	Detach hoses and connectors. Remove screws (2) and disconnect from lower grommets.	
4	Loosen air conditioning hose (3) from clip (4)		
5	Detach cooling module (10) from lower grommets		
	Convert		
6	Press out template (5) and set to correct dimension (a, b)	Determine actual dimension (a) from drawing. Divide target dimension (a) by determined actual dimension (a) and copy template with corresponding factor to original size. Check dimensions for both axes.	
7	Cut out holes (6) of template		
8	Using the holes (7), position the template on the left inner fender and fasten in place with adhesive tape		
9	Center punch body at bore (8)		
10	Remove template (5).		
11	Ø=19 mm bore hole at punch mark		***WH58.30-Z-1003-34A**
12	Deburr hole		

13	Clean, prime and paint hole		
	Install		
14	Mount clip (9) into hole		
15	Installing larger washer fluid reservoir	Have someone assist you in lifting the cooling module. Make sure that the container is positioned correctly in the grommets and that the clip is properly seated. Fasten inner side of container using screws (2). Tighten hoses and connectors again. **Level sensor is not required** .	
16	Mount cooling module (10) in grommets again		
17	Fasten AC system hose (3) onto clip (4) again		
18	Install radiator crossmember again		**AR62.30-P-2300GH**
19	Fill washer fluid reservoir		

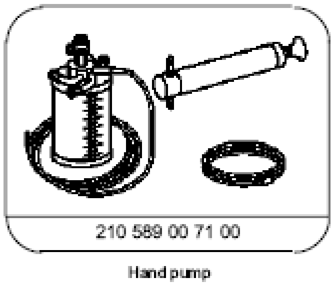


Fig. 412: Identifying Hand pump (210 589 00 71 00)

Commercially available tools

Number	Designation
WH58.30-Z-1003-34A	Step drill bit dia. 16-30.5 mm

Parts ordering notes

Part no.	Designation	Quantity
000 986 06 50	Priming pin	1
163 860 11 60	Washer fluid reservoir, 2 pumps with level sensor	1

163 869 00 14	Clip	1